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Abstract

Past research has clearly demonstrated the ability of various primes to influence behavior; however, little is understood about how and why primes work. The present research takes a theory-based approach to begin to understand this further. First, it investigates whether a picture prime has the ability to influence cooperative and competitive concept activation and implicit associations. Then, it examines whether the characteristics of the picture prime, specifically the race of the individuals depicted in the prime and whether it matches the race of the participant (i.e., demographic similarity), moderate these effects. Secondly, the present research investigates whether the same picture primes can impact cooperative and competitive behavior, and how those primes interact with explicit instructions to behave either cooperatively or competitively. Through a series of two studies, initial support is provided for the primes' ability to impact implicit associations, with some support that demographic similarity may moderate these effects. However, the impact on implicit associations was not consistent across both studies presented herein. Further, neither the primes nor the explicit instructions used in the present research appeared to influence concept activation or behavior as operationalized in the present research. In fact, the researcher believes the compensation given to participants for completing the study became the primary driver behind of how they behaved. Implications for future research, including measurement and generalizability considerations, are discussed.

You Look Like Me: The Impact of Demographic Similarity on Picture Primes' Effectiveness

Priming, or passively and unobtrusively activating relevant mental concepts using external stimuli (Gollwitzer & Oettingen, 2012), has a long history in social psychological research investigating primes' impact on various mental processes (e.g., attitudes, stereotypes), and behavior (e.g., Bargh, 1994; Bargh, Chen, & Burrows, 1996; Higgins, Bargh, & Lombardi, 1985). However, there is a much shorter history related to how priming impacts behavior at work, particularly when using primes that are more practical for a work environment, such as pictures. While research has demonstrated the ability of a picture prime to improve task or work performance via the activation of automatic goals (e.g., Shantz & Latham, 2009; Stajkovic, Locke, & Blair, 2006), less is understood about the mechanisms underlying these primes' effectiveness, the ideal characteristics of a picture prime, or the ideal conditions for priming. Further, little research has expanded beyond priming achievement-related goals at work. Consideration of when and how primes impact work-relevant behavior is increasingly critical as the demands of the work environment continue to pull our cognitive resources in multiple directions. This depletes our limited conscious processing capacity, leaving ample opportunity for automatic processing to impact behavior at work. Priming is one way that we may be able to influence automatic processes (e.g., Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001; Shantz & Latham, 2009; Stajkovic, et al., 2006), which can occur without intention and are cognitively inexpensive, while controlled processes are effortful and consume valuable cognitive resources (Bargh & Chartrand, 1999).

Shifting some self-regulation activities, such as goal pursuit, to nonconscious processing could be an adaptive way to effectively handle situations high in cognitive load (Bargh et al., 2001). Further, understanding how to optimize the effectiveness of a picture prime could allow organizations to leverage these unobtrusive and easily implemented interventions to direct automatic behavior in a way that would be beneficial for both employees and the organization (Shantz & Latham, 2011).

The present study will take a step toward deepening this research base by seeking to understand whether the demographic characteristics of people depicted in a picture prime have an impact on the prime's effectiveness. It will also focus on priming competition and cooperation, work-related behaviors that have previously not been the focus of picture priming research, but which can be critical to team success (e.g., Beersma, Hollenbeck, Humphrey, Moon, Conlon, & Ilgen, 2003).

History of Priming Research

By 1985, research in both cognitive (e.g., Forbach, Stanners, & Hochhaus, 1974; Meyer, Schvaneveldt, & Ruddy, 1975) and social psychology (e.g., Bargh & Pietromonaco, 1982; Rholes & Pryor, 1982) had established that priming has the ability to activate mental concepts related to the prime, which are subsequently more likely to be used when processing stimuli presented after the prime (Higgins et al., 1985). Further, it was understood that using the primed concept in processing the subsequently presented stimuli was more likely if the prime was presented more frequently, and less likely with a longer delay between the presentation of the prime and presentation of the subsequent stimulus (e.g., Higgins & King, 1981; Higgins et al., 1985). This early research largely involved the presentation of a word or group of words as the prime, followed by either a

categorization task or impression formation task, and demonstrated that "momentary, and even accidental, contextual factors can have a considerable influence on how people categorize stimulus information" (Higgins et al., 1985, p. 68). From there, research turned to demonstrating that stereotypes and attitudes can be automatically activated by contextual cues (see Bargh, 1994 for a review). This laid a foundation for future research, which began to take priming research beyond an investigation of automatic social perceptions and attitudes to an investigation of automatic social behavior.

Priming Social Behavior

In a pivotal series of studies, Bargh et al. (1996) demonstrated that primes can elicit automatic social behavior. Their studies were unique compared to previous studies demonstrating a behavioral link (e.g., Carver, Ganellen, Froming, & Chambers, 1983), because there was no explicit directive for participants to engage in the behavior that was being primed. Thus, Bargh et al. (1996) were able to discern whether the behavior was activated automatically, that is, outside of conscious awareness. Their results showed that those primed with rudeness using a Scrambled Sentence Test interrupted an experimenter significantly more quickly than those primed with politeness or with neutral words. Further, those primed with words associated with the elderly, which purposely excluded the concept of slowness, walked significantly slower after the experiment compared with those who were primed with neutral words. This suggested that participants' full stereotype of the elderly, including slowness, was activated and subsequently influenced behavior, and occurred despite the intentional exclusion of slowness-related words from the priming task. In a final experiment, participants primed subliminally with pictures of African American faces reacted with significantly more

hostility upon being told that they may need to do an experimental task over again compared to those who were subliminally primed with Caucasian faces. In total, this research demonstrated that primes, which had been used in previous research to activate perceptual processes or stereotypes, could also activate related automatic behavior. This was a key step in showing that social behavior can occur unintentionally and without conscious awareness.

The ability to elicit various automatic social behaviors with incidental environmental cues has since been replicated across multiple studies, even for more complex behaviors. For example, Dijksterhuis and van Knippenberg (1998) primed either intelligence using the stereotype of professors or stupidity using the stereotype of soccer "hooligans" and found participants primed with intelligence performed significantly better on a knowledge test than non-primed participants, while participants primed with stupidity performed significantly worse than non-primed participants.

There is also evidence to support that the behavior of others can serve as a prime and influence our behavior outside of our awareness. Chartrand and Bargh (1996) found that participants mimicked conversation partners' gestures, such as shaking their foot or rubbing their face. They did this without being aware they were doing so. In addition to mimicry, researchers have found that we adapt our behavior to others'. For instance, participants were more likely to assume a submissive position when their conversation partner assumed a dominant position (Tiedens & Fragale, 2003). Again, this occurred without participants being aware of their own posture, much less that their partner's posture was influencing them.

Our automatic behavior can even have an influence on others, with unintended consequences. Building on the research described earlier showing that pictures of African American faces elicited more hostile behavior than Caucasian pictures, Chen and Bargh (1997) again found that participants subliminally primed with African American faces acted significantly more hostile toward African American interaction partners than those primed with Caucasian faces. Not surprisingly, the interaction partners who had been treated with more hostility acted significantly more hostile in return. Thus, the behavior that was elicited automatically by the prime inadvertently led to a confirmation of the African American hostility stereotype.

The strength of an activated stereotype's influence on behavior may also have moderators. Again building on Bargh et al.'s (1996) research, Dijksterhuis, Aarts, Bargh, and van Knippenberg (2000) found that the effect of an elderly prime on free recall memory test performance was moderated by participants' reported level of contact with the elderly. Those who reported more contact with the elderly performed significantly worse on the memory test than those who reported less contact with the elderly. Cesario, Plaks, and Higgins (2006) found that implicit attitudes also moderate this relationship: primed participants who had negative attitudes toward the elderly walked more quickly after the experiment, whereas those with positive attitudes toward the elderly walked more slowly. Those with negative attitudes appeared to want to "escape" the experiment more quickly after being primed with a concept they implicitly disliked.

Priming Goal-Directed Behavior

Research has also expanded to priming other types of behavior, including goal pursuit. This follows the auto-motive hypothesis (Bargh, 1990; Bargh & Gollwitzer,

1994), which purports that although many goals are a pursued as a result of conscious deliberation, goals can also be activated and pursued automatically. Just as other mental concepts, such as stereotypes and attitudes, are formed through the repeated pairing of a target stimulus (e.g., elderly) with the stereotyped attributes (e.g., slow) or a valance (e.g., good/bad), the auto-motive hypothesis purports that goals can also be repeatedly acted upon in certain situations. Thus, when that situation is encountered, goal pursuit can be prompted automatically. Chartrand and Bargh (1996) demonstrated this was possible in a series of experiments. In the first experiment, participants were primed with a Scrambled Sentence Test containing words related to either an impression formation goal (i.e., opinion, personality, impression) or a memory processing goal (i.e., absorb, remember, retain). Those primed with an impression formation goal were better able to organize and retain subsequently presented information than those primed with a memory processing goal. In a second experiment, participants primed subliminally with an impression formation goal formed immediate (on-line) impressions of a fictional person that was described later in the experiment, while those not primed with a memorization goal did not form an on-line impression. Importantly, these studies replicated earlier research that had used explicit goals, demonstrating the ability of a primed impression formation goal to have similar effects. Further, participants did not report any awareness of the priming manipulation's effect on their behavior.

Bargh et al. (2001) built on this research in a series of five experiments that primed either a goal to perform well or to cooperate. The researchers proposed that, regardless of whether a goal is activated consciously or subconsciously, it will guide a person's goal-relevant cognition, affect, and behavior from the time it is activated. In the

first experiment, researchers primed a goal to perform well using a word search puzzle containing words related to achievement (e.g., succeed, attain, achieve). Participants were then given three more word search puzzles and instructed to find as many words as possible in ten minutes. Those who were primed with achievement words found significantly more words in the word search puzzles compared to those whose first puzzle only contained neutral words. This demonstrated the ability of an achievement prime to impact performance. Again, participants were not aware of the prime's effect on subsequent tasks. In the second experiment, Bargh et al. (2001) sought to tease apart the effects of conscious and subconscious goals, since all participants in the first experiment had been given a conscious goal to find as many words as possible. To do this, participants were primed with cooperation or a neutral prime using a Scrambled Sentence Test, and were also given either an explicit goal to cooperate or no explicit goal. Cooperation was measured using a resource-dilemma task in which participants harvested fish from a common resource pool that had to be replenished periodically. Participants given either a conscious or a subconscious goal to cooperate replenished significantly more fish than participants given neither type of goal. The interaction between the conscious and subconscious goals was not significant; however, an examination of mean differences suggests the effects may have been additive (M_{primed} = 31.1, $M_{explicit}$ = 32.1, $M_{primedxexplicit}$ = 35.1). Regardless, this study demonstrated the ability of a subconscious goal to act on its own, without "piggybacking" off of a simultaneously set conscious goal.

In either of these initial experiments, it is possible that factors other than strictly goal activation could explain the results. Specifically, the primes could have activated the semantic categories of performance or cooperation, implying to participants that the

situation demanded higher performance or more cooperation; although, this explanation is less likely since participants did not report awareness of the primes' effect in either experiment. It is also possible that, rather than priming goals, the first two studies primed behavior directly. In the third experiment, Bargh and colleagues (2001) attempted to rule out these alternative explanations. To test this, they hypothesized that, if a motivational process (i.e., a goal) was in fact being primed, it would increase in strength over time until the goal was attained. However, if non-motivational constructs were being primed, their activation would remain steady or decrease over time. Replicating past research, participants who were primed with an achievement-related word puzzle attributed significantly more achievement orientation to a fictional person during an impression formation task. Those primed with an achievement-related word puzzle also performed significantly better on a subsequent word puzzle task, replicating the first study by Bargh et al. (2001) described earlier. Interestingly, when a delay was introduced, the effect of the prime on impression formation decayed, while the effect of the prime on performance increased. This was the difference the researchers expected to find between a task involving the perceptual activation of achievement (impression formation) versus activation of an achievement goal (word search performance), and provides compelling evidence that subconscious *goals* had been primed.

In their final two experiments, Bargh et al. (2001) found further evidence that subconscious goals operate in a similar manner to conscious goals. Participants primed with achievement were significantly more likely to persist in the face of obstacles on a Scrabble word creation task (i.e., continue working after being told to stop) than were non-primed participants. They also found that those primed with achievement were

significantly more likely to resume the Scrabble word creation task after being interrupted and given the choice to continue the latter or switch to a more enjoyable task. Altogether, this research demonstrates that behavioral goals can become activated outside of awareness, and, once activated, operate in a similar fashion to consciously-held goals in that they promote goal-directed action, increase in strength until achieved, persist in the face of obstacles, and are likely to be resumed after disruption.

This research paradigm suggests that we are influenced by contextual cues, or primes, in our environment. These cues have the ability to influence various mental processes, including perception, attitudes, and stereotypes. They also have the ability to influence our behavior, both directly and through the activation of automatic goals. In total, this research supports that our behavior in any given situation is likely guided in part by automatic processing, implying that we are regularly not aware or in control of all the determinants of our behavior.

While it is not as controversial now as it may have been in 1985 to suggest that priming can impact behavior outside of conscious awareness, questions have been raised about the theory behind the effects of priming due to the largely experimental nature of priming research. To begin to understand the phenomena seen in priming research, we can first turn to dual process theories.

Theoretical Underpinnings of Priming: Dual Process Theories

Dual process theories assert the existence of both automatic and controlled information processing systems, and shed light on the circumstances under which one or the other is more likely to drive behavior. Both the Motivation and Opportunity as Determinants model (MODE; Fazio & Towles-Schwen, 1999; Olson & Fazio, 2009) and

the Associative-Propositional Evaluation model (APE; Gawronski & Bodenhausen, 2006) distinguish between automatic and controlled processes. According to both theories, automatic processes can occur without intention and are cognitively inexpensive, while controlled processes are effortful and consume valuable cognitive resources (Bargh & Chartrand, 1999). Automatic processes are based on learned associations of one concept to another, whether that is the repeated pairing of a target stimulus with a positive or negative valence to form an attitude, or repeated behavior in a given situation that may form an automatic goal. These associations can become activated unintentionally and outside of awareness upon encountering relevant environmental stimuli (Gawronski & Bodenhausen, 2006). On the other hand, controlled, or propositional, processes are based on the explicit consideration of the various sources of information one deems pertinent to the current situation (Gawronski & Bodenhausen, 2006). Propositional processing would involve conscious consideration of attitudes and beliefs toward a given person, or conscious pursuit of a goal.

The MODE model sheds further light on when we are more likely to engage in automatic versus propositional (controlled) processing (Fazio & Towles-Schwen, 1999; Olson & Fazio, 2009). It identifies automatic processing as the typical mode. In other words, as we go about our daily life, attitudes, stereotypes, and goals are activated automatically by our environment and can regularly influence behavior in a spontaneous manner. As demonstrated in Bargh et al.'s (1996) research, automatic behavior can also be activated directly by our environment. This may be occurring constantly, influencing what we do without active consideration or awareness of our environment's impact on attitudes, stereotypes, goals, or behavior (Olson & Fazio, 2009). While this may initially

sound surprising, examples from daily life readily come to mind: just think of how many times you get in your car to drive to work. Your car (the object) and driving to work (the goal) are repeatedly paired with one another, and thus may be strongly associated in memory. As such, after you have driven to work in your car countless times, the goal of driving to work may become activated automatically when you sit down in your driver's seat, directing your driving behavior along the route you take to work every day. Unfortunately, this can occur even when you intended to drive to the grocery store.

This is not to say that we are forever doomed to drive to work when we intended to go elsewhere. The MODE model suggests that controlled processing can effectively "override" the automatic mode, but only when we possess sufficient motivation and opportunity to do so (Olson & Fazio, 2009). Controlled processing involves an evaluation of potential courses of action, reflecting on the different attitudes, stereotypes, goals, and/or behaviors relevant to each alternative. Thus, it is thought to involve much more cognitive effort than the spontaneous mode, and requires some motivational force, such as the motivation to arrive somewhere on time or the motivation to be accurate, in order for an individual to be pushed into more deliberation (Olson & Fazio, 2009). In addition to motivation, the opportunity to engage in deliberative processing is also necessary. This can take several forms, including sufficient time to consider all relevant information, lack of fatigue, and availability of cognitive resources (Fazio & Olson, 2003). Think again of the example of driving, this time to an unfamiliar place for a party. You may be motivated to arrive to this party on time, and thus engage in more explicit consideration of how you will get there. You may look up directions beforehand or use GPS on the drive. In this case, the automatic association between your car and driving to

work is overridden by your deliberate effort to get somewhere else. In this way, dual process theories help us understand the coexistence of both automatic and controlled processes, and the circumstances under which we are most likely to engage in one or the other.

Support for automatic processing as the default mode can be seen in much of the priming research described earlier. Without conscious motivation to override the prime, and in some cases opportunity, such as when experimental tasks were cognitively demanding, primed concepts were able to influence participants' behavior outside of awareness. Particularly interesting are Bargh et al.'s (2001) findings demonstrating the similarity of conscious and nonconscious goal pursuit. Unlike priming perceptual processes, such as impression formation, the effects of goal priming appeared to activate persistence, both over time (until goal achievement) and in the face of obstacles. Nonconscious goal pursuit may also explain the ability to elicit more complex behaviors with a prime, such as higher performance when the stereotype of a professor is activated. The prime may activate a goal to perform well that is associated with the stereotype of a professor (Bargh et al., 2001). This research suggests that, not only is automatic processing the default mode, but it is a "sophisticated, flexible, and adaptive unconscious behavior guidance system" (Bargh & Morsella, 2008, p. 78), one that can respond flexibly to a changing environment (Bargh et al., 2001; Hassin, Bargh, & Zimerman, 2009). Further, nonconscious processes that are elicited automatically, whether goals or behavior, are proposed to have a benefit over conscious processes because they are thought to consume fewer cognitive resources (Latham et al., 2010). This has prompted

organizational researchers to delve furtherer into understanding nonconscious goal activation specifically.

Activation Theories

Several priming theories have focused on the activation of various mental concepts as an explanation for the effects found in priming research: goals (Latham & Locke, 2007), self (Wheeler, DeMarree, & Petty, 2007), and more general activation misattributed to the current target of one's attention (Loersch & Payne, 2011). The primary criticism of these theories is that they are too narrowly focused (Schroder & Thagard, 2013). Goal-based motivational theories (e.g., Goal Setting Theory; Locke & Latham, 1984; Locke & Latham, 1990; Locke & Latham, 2002), have traditionally focused on the effectiveness of conscious goals for influencing performance and behavior (Shantz & Latham, 2009). While Goal Setting Theory does have a great deal of empirical support (Diefendorff & Chandler, 2011; Jex & Britt, 2008), it has traditionally failed to account for the fact that conscious cognitive processing is a limited resource (Bargh & Williams, 2006). More recent work on goal setting has recommended a greater focus on the activation of nonconscious goals (e.g., Latham & Locke, 2007; Latham & Pinder, 2005; Latham, Stajkovic, & Locke, 2010; Locke & Latham, 2006), citing goal setting theory's exclusion of nonconscious goals as a limitation (Locke & Latham, 2002). Bargh et al.'s (2001) research described earlier supports the idea that goal activation can prime goal-directed behavior. While a conscious goal "remains in the periphery of consciousness" throughout goal pursuit, subconscious goals affect performance without requiring individuals' awareness of the goal (Locke & Latham, 2006, p. 267). This suggests that nonconscious goals could be of practical use in organizations, eliciting

additional complex behaviors without the consumption of cognitive resources (Latham et al., 2010). This has prompted further research into priming goal-directed behavior in an organizational context, work that is reviewed later.

Wheeler et al.'s (2007) active-self theory proposes that one's concept of self plays a critical role in a prime's impact on behavior. According to this theory, the activation of attitudes, traits, stereotypes, and other constructs impacts behavior through the activation of different self-representations that may be either consistent or inconsistent with the primed concept. We possess a great deal of information about ourselves, of which only a piece may be activated or immediately relevant at any given time. This theory helps account for the possibility that different individuals can have different reactions to the same prime, depending on how the prime activates their self-concept. Think of Cesario et al.'s (2006) research in which participants' response to an elderly prime varied depending on their attitudes toward the elderly. According to Wheeler et al. (2007), those with a negative attitude toward the elderly experienced activation of an out-group whom they disliked, leading to a stronger activation of self as different and an implicit desire to get away. What is unclear using Wheeler et al.'s theory is what happens when a prime is presented that is unrelated to any information one currently possesses about oneself.

Loersch and Payne (2011) attempt to overcome this limitation by taking a broader view of how concept activation can impact behavior. They propose that priming effects result from misattributing whichever concept is activated by a prime to the target in the environment that is currently the focus of one's attention. For example, one may attribute aggression to an African American interaction partner after activation of the aggression

stereotype, leading one to act aggressively toward that interaction partner. The primed construct is misattributed as part of one's own internal thought process and used as a potential source of information in subsequent decisions, behavior, and motivation. Unlike Wheeler et al. (2007), Loersch and Payne propose that any concept, not just the self, can be the source of this misattribution. However, this theory seems to assume a more conscious processing of the information activated by a prime during the misattribution process, despite the majority of research finding participants were unaware of any connection between their behavior and the prime.

An Integrated Priming Theory

While dual process and activation theories begin to inform our understanding of priming, they fail to fully account for the multifaceted and potentially competing stimuli we encounter every day, often simultaneously. Schroder and Thagard (2013) believe that all of these theories explain only a piece of the puzzle. They propose an integrated theory comprised of three general mechanisms of information processing that account for the psychological, cultural, and biological underpinnings of priming. These mechanisms include parallel constraint satisfaction (psychological), affective meaning maintenance (cultural), and semantic pointers (biological) and are believed to account for the myriad of effects found in priming research to date.

According to Schroder and Thagard (2013), all mental representations can be thought of as a network of constraints, both positive and negative. Positive constraints exist between concepts that go together (e.g., writing your dissertation and completing your PhD). Negative constraints exist between concepts that are incompatible (e.g., completing your PhD and binge-watching Netflix). Parallel constraint satisfaction is the

mechanism that organizes all of these mental representations into a holistic, meaningful pattern in which compatible concepts remain active and incompatible concepts are inactivated (e.g., deciding to binge watch Netflix and not think about completing your PhD; in other words, thoughts about completing your PhD are inhibited). Parallel constraint satisfaction models are not new and have been applied to cognitive functions, such as letter perception (McClelland & Rumelhart, 1981), and psychological phenomena, such as impression formation (Kunda & Thagard, 1996). Schroder and Thagard (2013) propose that all constraints discussed in previous theories (e.g., traits, stereotypes, self, goals, environmental stimuli) can shape behavior simultaneously. These constraints can be thought of as a system of system of interconnected nodes. All of these nodes have a degree of activation that can either excite (compatible nodes) or inhibit (incompatible nodes) related mental concepts upon encountering a prime, resulting in a meaningful pattern of activation and inhibition (Schroder & Thagard, 2014). This pattern is then interpreted in a Gestalt-like manner to understand the current situation, which leads to behavior that is regulated by the second proposed mechanism, affective meaning maintenance (Schroder and Thagard, 2013).

Affective meaning maintenance is based in affect control theory, which purports that individuals choose social behavior that is consistent with the affective meaning of the situation at hand (Heise, 1979, 2007). In other words, we want to create affective consistency with the situation based on what our culture demands (Schroder and Thagard, 2013). This allows for coordinated interpersonal interaction in a given culture, as members of one culture generally agree on the appropriate affective meaning for a given social role, institution, setting, or behavior (Heise, 2010). Affective meaning thereby

provides an efficient mechanism for automatically aligning behavior with cultural expectations (Schroder & Thagard, 2014). As such, parallel constraint satisfaction can be viewed as operating at the individual level, whereas affective meaning maintenance operates at a cultural level. Both have a role to play in behavioral priming. For example, encountering a member of an in-group could lead to a stronger activation of your sense of self and familiarity. It is likely that this pattern of activation would lead to more positive affective meaning, potentially making it more likely that you would behave warmly toward that member of your in-group.

The third mechanism proposed by Schroder and Thagard (2013) is semantic pointers. Semantic pointers are patterns of neural activity which relay affective meaning and are thought to be the biological mechanism underlying priming. Semantic pointers can result in two levels of meaning: shallow and deep. Shallow meaning is interpreted at the conceptual level only and may not necessarily lead to any action. Deep meaning, however, goes beyond the conceptual level and elicits physical action or behavior (Schroder & Thagard, 2013). In this way, semantic pointers lead to the prime-consistent behaviors that have been observed in past research. Schroder and Thagard (2013; 2014) have created simulations of semantic pointers and successfully replicated the effects found in past research. Further, the researchers propose that semantic pointers provide biological support for dual process theories in that consciously-driven semantic pointers, such as intentions, may fail to elicit action when there are competing factors, such as high cognitive load. This is consistent with the tenants of the MODE model: without sufficient motivation or opportunity, our intentions can be overridden by the semantic pointers automatically activated by our environment.

In summary, Schroder and Thagard propose a promising theory that integrates previous explanations for priming into a multilevel model accounting for psychological, cultural, and biological mechanisms. Priming activates a given concept in the mind of the person being primed. Parallel constraint satisfaction helps us understand how the primed concept is integrated with other currently active representations to form a Gestalt-like impression of oneself in the present situation. Affective meaning maintenance constrains behavior based on cultural norms and previous interactions, creating alignment of automatic social behavior to those norms. Finally, semantic pointers can be viewed as the biological mechanism underlying priming. They represent affective meaning through a pattern of neural activation, which can lead to deep meaning, otherwise known as behavior. Overall, this theory may aid in explaining some of the differential findings in priming research and account for a wider array of effects.

Priming and Organizational Behavior

While the priming research described earlier focused primarily on social interaction and behavior, more recent work has turned the focus to priming's applicability in the work environment. Much of this research stemmed from interest in integrating automatic processes into goal-setting theory, exploring the ability of nonconscious goals to elicit commensurate behavior.

Priming Applied to Goal Setting Research

In one of the first studies to extend Chartrand and Bargh's (1996) early work on nonconscious goal setting to work-relevant behavior, Stajkovic, Locke, and Blair (2006) conducted two studies investigating the impact of primed goals on task performance. In the first study, participants completed a word search task that contained either

achievement-related words (primed group) or achievement-neutral words (control group). They were then asked to brainstorm as many uses as possible for a wire coat hanger, a task commonly used in past goal setting research (Stajkovic et al., 2006). Participants in the primed condition brainstormed significantly more uses for the coat hanger than those in the control condition, demonstrating the ability of priming achievement to impact task performance.

The second study took this a step further, examining the effects of simultaneous conscious and nonconscious achievement goals on performance. Priming in this study took place via a Scrambled Sentence Test, again with either achievement-related or achievement-neutral words. Participants were also given one of three conscious goals: an easy goal, a goal to do their best, or a difficult goal. As in the first study, performance was measured by the number of uses participants were able to brainstorm for a wire coat hanger. The results of the first study were replicated: participants who were primed with achievement-related words brainstormed significantly more uses for a coat hanger than those who were not primed. Interestingly, results of Stajkovic et al.'s study also indicated an interaction between nonconscious and conscious goals. The prime significantly increased the effect of the difficult, conscious goal and the vague, "do your best" goal on brainstorming performance, demonstrating that priming may be able to enhance performance above and beyond conscious goals alone.

This research has since been extended further. In a two-part study, Shantz and Latham (2009) determined whether a prime more practical for organizational implementation could, first, increase achievement motivation and, second, lead to an increase in job performance. Since it is unlikely that traditional priming tasks, such as

the Scrambled Sentence Task, would be used in a work setting, Shantz and Latham (2009) chose a less obtrusive prime: an image demonstrating achievement. In the first study, their results indicated that participants who viewed the image of a woman winning a race had increased levels of achievement motivation, as measured by a Thematic Apperception Test (TAT). This took a step toward demonstrating how the achievement prime might be working: by increasing the activation of achievement motivation. In the second study, Shantz and Latham (2009) demonstrated that when call center employees were primed with the same image of a woman winning a race, they raised significantly more money for their employer (a university) compared to workers who were just told to do their best. Unfortunately, this study failed to replicate the interaction between conscious and nonconscious goals found by Stajkovic et al. (2006). However, based on an examination of the differences in group means, the lack of an interaction may have been due to low power rather than lack of an effect ($M_{primexdoyourbest}$ = 16.69 vs. $M_{noprimexdoyourbest}$ = 12.27 and $M_{primexdifficultgoal}$ = 20.67 vs. $M_{noprimexdifficultgoal}$ = 17.20).

Shantz and Latham (2011) were able to replicate their 2009 results in a similar study conducted in a different call center setting. Participants primed with the image of a woman winning a race again raised more money compared to those who were not primed. This effect held across different days of the week and different shifts. The results of all the field experiments in the 2009 and 2011 studies were then analyzed in a small-scale meta-analysis which found an overall moderate effective of the prime on fundraising performance (d = .56, $p < .05$).

More recent work has begun to expand nonconscious goal setting research beyond the boundaries of employee performance. For example, Ganegoda, Latham, and Folger

(2016) examined the effects of a primed justice goal on fair behavior in a negotiation task. In this series of experiments, the fairness prime was administered using a word search task. All participants were also given a performance goal of achieving at least a $5000 profit in the negotiation task. Those in the explicit fairness goal condition were also given a goal to negotiate a deal that was equally fair to both parties. Fairness was assessed as the discrepancy between the participants' profit and the profit of the other party, where a lower discrepancy was seen as fairer. This is consistent with past research that had used a similar task (Ganegoda et al., 2016). Similar to past research, participants primed with fairness demonstrated less profit inequality as did those given an explicit goal of fairness. The interaction between primed and conscious goals was not significant. In subsequent studies, the researchers demonstrated that the effect of both the primed and conscious goals on profit inequality was mediated by the saliency of justice, as measured by a word completion task.

Organizationally-Relevant Priming Outside the Goal Setting Paradigm

Outside the paradigm of goal setting, several other priming studies have been conducted to elicit work-relevant behavior, including competition (e.g., Kay & Ross, 2003; Kay, Wheeler, Bargh, & Ross, 2004), cooperation (e.g., Drouvelis, Metcalfe, & Pawdthavee, 2010; Utz, 2004), and moral identity (e.g., Leavitt, Zhu, & Aquino, 2016).

In their first study, Kay and Ross (2003) primed participants with competition or cooperation using a scrambled sentence task. They were then exposed to the decision matrix of a Prisoner's Dilemma game and asked what they would call it. Finally, they were asked to identify their most probable response from the decision matrix. The researchers found that those primed with a scrambled sentence task containing

competitive words were significantly more likely to choose a competitive name for the game (e.g., Battle of Wits) and demonstrated a significantly stronger intention to behave competitively in the game. Unfortunately, this study did not measure actual behavior in the game, only behavioral intentions.

In a later series of studies, Kay et al. (2004) used physical objects typically found in a business setting (e.g., board room tables, briefcases) to prime competition. The researchers found that these "mundane" objects made the construct of competition more accessible (as measured by a word completion task), resulting in participants perceiving an ambiguous situation as less cooperative, and led participants to retain more money for themselves in an ultimatum game that asked them to make an offer to a counterpart to split ten dollars. When participants offered to give their counterpart less than five dollars, that behavior was considered more competitive. In a final study, the researchers demonstrated that primes are likely to have a bigger impact on behavior when the social norms of the situation are not clearly defined: participants were more likely to behave competitively in a Prisoner's Dilemma game when it was titled the "Situation" than when it was called the "Community Game".

Whereas these studies by Kay and colleagues were focused primarily on eliciting competitive intentions or behavior, others have focused more specifically on cooperation. For example, Utz (2004) activated participants' self-concept by priming with the pronoun "I" and found that participants who were more prosocial (as measured by the Triple Dominance Measure of Social Value Orientation) made significantly more prosocial decisions in a series of games compared to a control condition. Interestingly, participants exposed to the same "I" prime but who were more individualistic made significantly

more pro-self-decisions in the same series of games. The researcher suggested that the "I" prime activated participants' self-concept; the increased salience of that self-concept led participants who were inherently more prosocial to behave more cooperatively.

Drouvelis et al. (2010) found further support for cooperative priming's ability to impact cooperative behavior in the form of social giving. The researchers primed cooperation using a word search puzzle. Participants then participated in a public goods game in which groups of three participants were each given 20 tokens. They then had to simultaneously decide how many tokens to keep for themselves and how many to give to the public good. Participants who were primed with cooperation gave significantly more to the public good. Interestingly, this effect was stronger for women than it was for men.

While this stream of research demonstrated the ability of a prime to elicit competitive or cooperative behavior, much of it has been conducted with experimental tasks (e.g., Scrambled Sentence Task) that are unlikely to be implemented in a real organizational setting. The present study will expand this research to a less obtrusive experimental design, similar to that used in much of the implicit goal setting research, and determine whether images depicting competitive or cooperative behavior in the workplace have the ability to, firstly, impact the activation of the concepts of competition and cooperation (Study 1) and, secondly, impact competitive and cooperative behavior (Study 2).

Hypothesis 1. Participants who view a competitive image will have significantly higher competition concept activation in that they will identify competitive words (a) significantly more quickly and (b) significantly more accurately than neutral words and non-words.

Hypothesis 2. Participants who view a cooperative image will have significantly higher cooperation concept activation in that they will identify cooperative words (a) significantly more quickly and (b) significantly more accurately than neutral words and non-words.

In addition to understanding whether competitive and cooperative images can impact concept activation and behavior, it is important to understand whether details of the image can augment or inhibit its effectiveness. Past research leveraging image primes has used a single image without systematically examining the subtle nuances of the prime that could be differentially impacting behavior. Because image primes are much richer than word primes, they may be activating a wider array of associations in memory and therefore a more complex set of semantic pointers. Better understanding how the specific aspects of an image impact behavior may ultimately help us better understand the ways in which our day-to-day encounters regularly influence automatic processes and behavior.

One potential characteristic of an image prime that could impact behavior is the similarity of the person(s) depicted in the prime to the individual viewing the prime. According to Social Identity Theory, people derive a sense of belonging from group membership (Tajfel & Turner, 1986). Furthermore, they tend to view their in-group more positively compared to other groups. Because in-group membership activates a sense of belonging, viewing an exemplar from one's in-group could activate stronger associations of one's self as similar, making it more likely that an individual would mimic the behavior demonstrated by the individual in the image. The affective meaning maintenance component of Schroder and Thagard's (2013) theory also supports this proposition: cultural norms could increase the likelihood that an individual will behave

more cooperatively toward a person who is similar to them. Our tendency to behave more favorably to those who are similar to us, often called in-group bias, is well documented is research over the last several decades (e.g., Ben-Ner, McCall, Stephane, & Wang, 2009; Ruffle & Sosis, 2006; Turner, Brown, & Tajfel, 1979).

Hypothesis 3. The effect of viewing a competitive image will have a significantly stronger effect on competition concept activation when participants view an image with individuals of their same race competing.

Hypothesis 4. The effect of viewing a cooperative image will have a significantly stronger effect on cooperation concept activation when participants view an image with individuals of their same race cooperating.

Not only could a picture prime activate a stronger sense of self, it could impact how strongly we associate ourselves with the behaviors depicted in the prime. Drawing on several priming theories' supposition that primes can activate different parts of our self-concept (e.g., Schroder & Thagard, 2013; Wheeler et al., 2007), it is possible that viewing similar others exhibiting competitive or cooperative behavior will commensurately heighten our association of self with competition or cooperation. However, this hypothesis does not appear to have been directly tested to date. As such, the following research questions are posed:

Research question 1. Will participants who view a competitive image associate themselves significantly more strongly with competition compared to participants who view a cooperative image and vice versa?

Research question 2. If an effect for research question 1 is found, will this effect be significantly augmented when participants view an image of individuals of their same

race either competing or cooperating, compared with those who view an image showing people of a different race?

Understanding whether a picture prime can impact the activation of competition or cooperation is the first step; hypotheses one through four and research questions one and two will be investigated in Study 1. However, the next logical question is whether the semantic pointers activated by the prime will translate into deep meaning and, subsequently, behavior (Schroder & Thagard, 2013). The past research reviewed herein largely supports the ability of picture primes to elicit related achievement behavior and of word primes to impact cooperative or competitive behavior. The second study in the present research will extend picture priming research to demonstrate its potential impact on cooperative and competitive behavior. Additionally, it will build on earlier implicit goal setting work (e.g., Shantz & Latham, 2009; Stajkovic et al., 2006) to explore the interplay of conscious and non-conscious goals. The following hypotheses and research question will be investigated in Study 2:

Hypotheses 5a and 5b. Viewing a cooperative or competitive image will lead participants to behave more (a) cooperatively or (b) competitively in a resource dilemma task when compared to a control condition with a no image.

Hypotheses 6a through 6d. When explicit and implicit goals are consistent, the effect on (a) competitive construct activation, (b) competitive behavior, (c) cooperative construct activation, (d) cooperative behavior will be significantly greater.

Past studies have supported the ability of consistent implicit and explicit goals to augment one another (e.g., Stajkovic et al., 2006); however, these studies have focused on explicit goals that prompted behavior in the same direction. In other words,

participants received both an implicit and explicit goal intended to elicit an increase in achievement or performance. The effect of conflicting implicit and explicit goals (e.g., an implicit goal to cooperate with an explicit goal to compete) has not been explored, so it is unclear which will have a stronger impact on behavior. Therefore, the following research question is posed:

Research question 3a and 3b. How will corresponding (a) construct activation and (b) behavior be impacted when explicit and implicit goals to behave cooperatively or competitively conflict?

Study 1 Method

Sample

Participants were recruited from Amazon's Mechanical Turk (MTurk). MTurk participants are referred to as "workers" and are compensated for their participation in the study at an amount determined by the researcher. Receipt of compensation is dependent on the researcher's approval. In other words, workers are not generally compensated if they do not fully complete the study or are otherwise disqualified (e.g., do not meet pre-screening eligibility requirements, answer study questions at random). To be eligible to participate in the present study, MTurk workers had to be located in the United States, have an approval rating of 93 percent or higher and have been approved (i.e., compensated) for at least 500 prior studies. These qualifications were put in place to help ensure data quality and reliability of the participant population. MTurk workers who successfully completed the present study were compensated fifty cents for their participation.

In total, 298 participants began the present study; however, only 101 participants fully completed it. There may be several reasons for this high drop-out rate. The vast

majority of participant drop-outs occurred between part one and part two of the study. Part one of the study was completed in Qualtrics survey software, while part two was run using Inquisit by Millisecond software. As described in the procedure below, participants were informed that they needed to be using a PC to complete the full study, because the version of Inquisit used in Study 1 was only compatible with a PC. Therefore, if participants chose to attempt the study on a cell phone or Mac despite being told they would be unable to complete the study, they would not have been able to continue past part one of the study. A second reason may be due to the study design itself. Due to limitations in the ability to automatically link the Qualtrics survey platform to Inquisit by Millisecond software in a multi-condition study design, participants were asked to manually click a link at the end of part one of the study in order to continue on to part two of the study. It is possible that many participants believed the study was complete after part one and ended their participation. A final reason for the drop-out rate may simply be fatigue. While the majority of participant drop-out occurred after part one of the study, not all requested payment and some participants chose to end their participation mid-way through part two of the study. In total, the study was not expected to take more than twenty minutes to complete. This information was included in the informed consent, but it appears that some participants still chose to end participation sooner. Participants who dropped out after part one of the study or failed to fully complete part two were not compensated for their participation, and their data were removed from analyses.

The 101 participants who were included in the present study's analyses were 57% female, and 78% White, 15% Black, 4% Asian, 1% Hispanic, and 1% other race. The

vast majority (99%) of participants indicated English as their primary language. Most participants were not currently in school (78%); the remaining participants were split relatively evenly across their second (4%), third (5%), forth (5%) and fifth (8%) year in college. The average age of participants was 39 (median 24), with an average tenure of 31 months in their current job (median 35).

Procedure

Participants completed the present study online using the Qualtrics survey platform and Inquisit by Millisecond software (Inquisit, 2011). The study was only viewable on MTurk's worker platform to those who met the eligibility criteria described previously. Participants were immediately informed that they must be using a PC in order for the study to run successfully. Then, they gave their informed consent to participate and completed basic demographic information, including gender, ethnicity, race, age, year in school (if applicable), and whether English is their primary language.

Next, participants were randomly assigned to a condition in which they viewed one of four images set in an office environment. The study design was a two (prime: competition vs. cooperation) by two (race of individuals in the image: African American vs. Caucasian) by two (order of implicit measures: IAT-first vs. LDT-first) fully crossed study design. Whether or not participants' race matched the race of the individuals depicted in the image was the key variable of interest when examining the race conditions. All participants were matched with the image on gender. For example, a female participant randomly assigned to the Caucasian/competition condition saw a group of Caucasian women behaving competitively in an office setting. A male participant randomly assigned to the African-American/cooperation condition saw a

group of African-American males behaving cooperatively in an office setting. See Appendix A for a detailed description of the pilot testing used to create and select the images and Appendix B for the images used in the present study.

After viewing the randomly-assigned image, participants were asked to describe what they believed was occurring in the image by typing their open-ended descriptions in a text box provided. This was done to ensure that participants spent adequate time looking at and processing the image before moving on to subsequent tasks. Responses were also examined to evaluate whether participants were interpreting the image as expected (e.g., viewing people in a work environment either competing or cooperating).[1] After providing their description of the image, participants were asked to click a link to continue on to the next portion of the study. The two remaining tasks in the present study were completed in Inquisit, and assessed concept activation.

Participants completed two implicit tasks in Inquisit: an Implicit Association Test (IAT) and a Lexical Decision Task (LDT), both of which are described in detail in Materials and Measures. The order in which participants completed the IAT and LDT was counterbalanced to control for the potential of additional priming effects generated by the task itself. After completing both implicit tasks, participants were thanked for their participation and compensated after the researcher was able to verify their completion of the full study.

[1] Examining participant descriptions of the image revealed nothing of concern. Participants described the image consistent with expectations, and there was nothing to indicate that the prime led them to guess the purpose of the study.

Measures

Concept Activation. There were two primary outcome measures used in the present study: the LDT and the IAT. While not as well-known as the IAT, the LDT has been widely used in semantic priming research. The LDT requires participants to identify whether a stimulus appearing briefly on the screen is a word or not. The design in the present study modeled design parameters used by Lepore and Brown (2002). Thirteen words representing either competition (e.g., competition, competitive, competing) or cooperation (e.g., cooperation, cooperate, cooperative) were used, depending on the condition participants were assigned to. Thirteen neutral words (e.g., thermometer, concentrate, hairdryer) were used, matched in length with the target words. Finally, twenty-six pronounceable non-words (e.g., yogurshways, purbrased, flazgowders) were included, matched in length to the twenty-six target and neutral real words.

After being presented with task instructions emphasizing both speed and accuracy, participants completed six practice trials followed by 52 test trials. Prior to each trial, a "ready" signal (centrally located dot) appeared on the screen for 700ms. In each trial, the stimulus (target word, neutral word, or non-word) appeared on the screen for 250ms. Participants were instructed to press the "I" key if the stimulus was a valid word and the "E" key if the stimulus was not a valid word. Both response latencies and accuracy in identification of target words compared to neutral and non-words were examined as an indication of construct activation.

The version (competitive or cooperative) of the LDT participants completed was matched to their condition, as it measured the activation of only the primed construct

compared to neutral and non-words. Conversely, all participants completed the same version of the IAT, which compared how strongly they associated competition versus cooperation with themselves.

The IAT (Greenwald, McGhee, & Schwartz, 1998) is the most widely used and accepted implicit attitude measurement method (Leavitt, Fong, & Greenwald 2011). IATs require participants to sort target words into categories by pressing different keys on the keyboard. During practice trials, only one word is associated with each key; however, in test trials, either congruent (i.e., press "i" for words associated with insect or bad, and "e" for words associated with flower or good) or the opposite, incongruent categories are presented together. Differences in response latencies for the various pairings are used in computing the strength of participants' category associations (i.e., flowers-good vs. flowers-bad).

The order in which these combined trials are presented (e.g., incongruent versus congruent first) has been shown to influence IAT scores: a bias is shown in the final IAT score toward a stronger association of those categories presented in the first block (Nosek, Greenwald, & Banaji, 2005a). Although the order of combined trials in the present study was not counterbalanced, increased practice trials were used between the incongruent and congruent trials. This has been shown to reduce order effects (Nosek, Greenwald, & Banaji, 2005b) and is a recommended best practice when designing IATs (Nosek et al., 2005a).

For the present study, a version of the IAT was used that measures the association of the target construct (e.g., compete or cooperate) with oneself. The categories of "competition" (e.g., competitive, competing, contesting) and "cooperation" (e.g.,

collaborative, cooperate, cooperative) were paired with the categories “me” (e.g. me, my, mine) and “others” (e.g., they, them, their). A stronger association of competition and me compared to others and competition indicates a stronger identification with competition. Similarly, a stronger association of cooperation and me compared to others and cooperation indicates a stronger identification with cooperation. See Appendix C for screen shots of the IAT used in the present study.

Study 1 Results

Data Screening

Before proceeding with analysis of the hypotheses, the data were cleaned, and screened for outliers. See Table 1 for descriptive statistics of all variables relevant for hypotheses one through four and research questions one through three. As noted when describing the Study 1 sample, 197 participants who began the study were omitted from analyses because they failed to complete any outcome measures. When univariate or multivariate outliers were identified relevant to each hypothesis or research question, the hypotheses and research questions were analyzed with and without outliers. Any differences in results are noted in the discussion of each hypothesis or research question. If no differences are noted, results reflect the full usable sample.

All variables were also screened for normality. All accuracy measures in the LDT for target words, neutral words, and non-words were significantly kurtotic using a cut-off of plus or minus two to indicate issues with normality (kurtosis statistics of 7.72, 5.59, and 6.88 respectively). However, this is somewhat expected given these variables represent percent of correct responses in each category: scores would be expected to cluster more heavily in one area with this type of measure versus follow a fully normal distribution. Therefore, these variables were not transformed in any analyses.

IAT scores were calculated according to the *D* scoring procedure (Greenwald, Nosek, & Banaji, 2003). For the IAT, individual trials with response latencies greater than 10,000 milliseconds and less than 400 milliseconds were removed. In addition, participants' IAT data were removed entirely if more than 10 percent of their IAT trials had response latencies less than 300 milliseconds, which resulted in the removal of ten participants' IAT data. Therefore, these participants' data were not included in any analyses that involved the IAT; however, they were still included in analyses involving the LDT. Because an error penalty is imposed by requiring participants to provide a correct response before proceeding in the IAT, no additional corrections or removals were made based on error rates. After removing trials and participants based on their response latencies, further removal based on error rates does not provide a large gain in validity. It has been argued that the small increment in validity is not worth the larger loss in data (Greenwald, et al., 2003). After cleaning the IAT data, independent samples t-tests were conducted to test for order effects of which word-pairings were presented first (self and cooperation or self and competition) on overall IAT scores. No significant order effects were found in the competition ($t(45) = 1.09$, $p = .283$) or cooperation condition ($t(40) = 1.28$, $p = .208$), so the overall IAT score was used in subsequent analyses.

Independent samples t-tests were also conducted on all outcome variables (LDT latency, LDT accuracy, and IAT scores) to test for order effects of completing the LDT or IAT first and gender effects. The order of implicit tasks had no significant effect on LDT scores (see Table 2). However, significant order effects were found on IAT scores in the competition condition ($t(45) = 2.05$, $p < .05$). Participants who viewed a

competitive prime and completed the IAT first had significantly more positive d scores (M = .60) compared to those who completed the IAT second (M = .41). This means that those who completed the IAT after the LDT associated themselves more strongly with competition compared to cooperation. Therefore, order of implicit tasks was controlled for in relevant analyses where IAT score was the outcome. Order effects were not controlled for in any analyses involving LDT latency or accuracy.

Next, potential gender differences in outcome variables were examined. None of the outcomes differed significantly by gender, so gender was collapsed across conditions for all subsequent analyses (see Table 3).

Table 1

Descriptive Statistics for Hypothesis 1-4, Research Questions 1-2

	Competition Condition			Cooperation Condition		
Variable	*n*	*M*	*SD*	*n*	*M*	*SD*
Target Word Latency	53	366.79	133.94	48	371.79	162.91
Neutral Word Latency	53	378.41	111.12	48	414.94	147.89
Non-Word Latency	53	417.56	136.16	48	428.50	138.91
Target Word Accuracy (%)	53	86.36	21.63	48	92.62	18.97
Neutral Word Accuracy (%)	53	82.00	18.22	48	80.61	17.88
Non-Word Accuracy (%)	53	85.78	24.09	48	89.82	18.43
IAT Score	48	0.50	0.33	42	0.22	0.34

Table 2

Summary of Screening Analyses for Order of Implicit Measures Effects

	Competition Condition			Cooperation Condition		
Variable	*n*	*t* (df)	*p*	*n*	*t* (df)	*P*
Target Word Latency	48	-.44 (46)	.663	42	.65 (40)	.518
Neutral Word Latency	48	.95 (46)	.346	42	.30 (40)	.767
Non-Word Latency	48	-.29 (46)	.777	42	-.08 (40)	.940
Target Word Accuracy (%)	48	.78 (46)	.440	42	-.66 (40)	.513
Neutral Word Accuracy (%)	48	-.22 (46)	.829	42	-.47 (40)	.643
Non-Word Accuracy (%)	48	.79 (46)	.436	42	-.24 (40)	.816
IAT Score	48	2.05 (46)	< .05	42	-.23 (40)	.818

Table 3

Summary of Screening Analyses for Gender Effects

	Competition Condition			Cooperation Condition		
Variable	*n*	*t* (df)	*p*	*n*	*t* (df)	*p*
Target Word Latency	53	1.56 (51)	.125	48	.88 (46)	.384
Neutral Word Latency	53	1.18 (51)	.244	48	.05 (46)	.960
Non-Word Latency	53	1.36 (51)	.180	48	.72 (46)	.478
Target Word Accuracy (%)	53	.96 (51)	.339	48	-.33 (46)	.741
Neutral Word Accuracy (%)	53	.85 (51)	.398	48	-.70 (46)	.488
Non-Word Accuracy (%)	53	1.11 (51)	.272	48	-.43 (46)	.670
IAT Score	48	.36 (46)	.717	42	-.55 (40)	.587

Primary Analyses

Hypothesis 1 stated that participants who received a competition prime would have the concept of competition significantly more activated in their mind. This was tested by examining differences in response latencies and accuracy in the LDT with a series of repeated measures analysis of variance (RM-ANOVA) tests. It was expected that those in the competition condition would identify competitive words significantly more quickly and accurately when compared to neutral and non-words. Support for hypothesis 1 was mixed. First, within subjects' effects for latency were examined. Mauchly's Test of Sphericity was significant ($p < .001$), so adjusted degrees of freedom were used in significance testing for main effects. Overall, there was a significant main effect of priming condition for latency ($F(1.54, 80.12) = 6.69$, $p < .01$, $\eta^2 = .11$). After viewing a competitive prime, participants identified competitive words the fastest (M = 366.79 milliseconds), followed by neutral words (M = 378.41), and then non-words (M = 417.56). However, pairwise comparisons revealed that only the difference in response latencies between competitive words and non-words was significant ($p < .01$). The difference between competitive words and neutral words was not ($p = .447$).

Next, within subjects' effects for accuracy were examined. Again, Mauchly's Test of Sphericity was significant ($p < .001$), so adjusted degrees of freedom were used in significance testing for main effects. There was a significant main effect for accuracy ($F(1.56, 81.04) = 1.90$, $p < .05$, $\eta^2 = .04$). After viewing a competitive prime, participants identified competitive words with the highest accuracy ($M = 86.36\%$), followed by non-words ($M = 85.78\%$), then neutral words ($M = 82.00\%$). Pairwise comparisons revealed only the difference between competitive words and neutral words was significant ($p < .05$).

Hypothesis 2 was similar to hypothesis 1, but focused on the cooperative prime. Again, a series of RM-ANOVA tests were conducted to test this hypothesis, which yielded full support. When examining within subjects' effects, there was a significant main effect for latency ($F(2, 94) = 5.40$, $p < .01$, $\eta^2 = .10$). After viewing a cooperative prime, participants identified cooperative words the fastest ($M = 371.79$ milliseconds), followed by neutral words ($M = 414.95$), and then non-words ($M = 428.50$). Pairwise comparisons revealed the differences in response latencies between both cooperative words and neutral words ($p < .01$) and cooperative words and non-words ($p < .01$) were significant.

There was also a significant within subjects' effect for accuracy ($F(2, 94) = 27.01$, $p < .001$, $\eta^2 = .37$). After viewing a cooperative prime, participants identified cooperative words with the highest accuracy (92.63%), followed by non-words (89.82%), then neutral words (80.61%). Pairwise comparisons showed that the difference in accuracy between cooperative words and neutral words was significant ($p < .001$), and the difference between cooperative words and non-words approached significance ($p =$

.07). Given the large effect size of the main effect, it is possible this result is due to low power.

Hypotheses 3 and 4 explored the effect of race on concept activation. Hypotheses 3 and 4 predicted that participants in the competitive (cooperative) condition who viewed individuals the same race as themselves competing (cooperating) would have significantly higher competition (cooperation) concept activation than those who viewed individuals of a different race competing. These hypotheses were tested through a series of 2 (prime: competitive or cooperative) by 2 (race: match or no match) ANOVAs. Hypothesis 3 and 4 would have been supported if significantly larger difference scores were found when participants' race matched the race of individuals depicted in the image compared to when it did not. However, hypotheses 3 and 4 were not supported (see Table 4). No significant differences were found between groups when comparing target word latency versus non-word or neutral word latency difference scores. Further, no significant differences were found when comparing accuracy differences for target versus non-words. There was a significant interaction when comparing differences in accuracy for target versus neutral words; however, results were found in the wrong direction. In the competitive condition only, there was a larger difference in accuracy for participants whose race did not match those in the image (M = 7.70%), compared to those whose race did match (M = 0.30%). In other words, participants who viewed individuals of a *different* race acting competitively had even higher activation of the concept of competition (as measured by one measure of accuracy) than those who viewed individuals of their same race acting competitively. See Table 4 for a summary of RM-

ANOVA results for Hypotheses 1 through 4 and Table 6 for a summary of means and standard deviations.

Table 4

Summary of Results for Hypotheses 1-4: RM-ANOVA

	LDT Latency				LDT Accuracy			
Hypothesis	*n*	*F* (df)	*p*	η^2	*N*	*F* (df)	*p*	η^2
1. Competitive Concept Activation	53	6.69 (1.54, 80.12)	< .01	.11	53	1.90 (1.56, 81.04)	< .05	.04
2. Cooperative Concept Activation	48	5.40 (2, 94)	< .01	.10	48	27.01 (2, 94)	< .001	.37
3 & 4. Race Matching for Neutral vs. Target Words	101	1.24 (3, 97)	.299	.04	101	4.56 (3, 97)	< .01	.12
3 & 4. Race Matching for Nonword vs. Target Words	101	0.69 (3, 97)	.560	.02	101	0.27 (3, 97)	.845	.01

Several research questions were also posed regarding how the primes in the present study would impact how strongly participants associated themselves, versus others, with the primed concept. Research Question 1 asked whether participants who viewed a competitive image would associate themselves more strongly with competition and whether participants who viewed a cooperative image would associate themselves more strongly with cooperation, as opposed to associating those concepts with "others". Because order of implicit tasks was found to effect IAT scores, an analysis of covariance (ANCOVA) was conducted with order of implicit tasks as the covariate.

A significant main effect for condition was found ($F(1, 86) = 15.84$, $p < .001$, $\eta^2 = .16$) such that participants who viewed a competitive image had significantly higher overall IAT scores ($M = .50$) than participants who viewed a cooperative image ($M = .22$). Cohen's D between these two means is 0.84, a large effect. The IAT was scored such that higher, positive scores reflect a greater

association of self with cooperation and others with competition. This result means that participants who viewed a competitive image actually showed overall D scores reflecting a greater association of self with cooperation relative to others. However, because the IAT is a comparative measure, the overall D score does not tell us whether this result was produced because the prime caused respondents to more greatly associate themselves with cooperation, or because the prime caused respondents to more greatly associate others with competition. Given the image showed other people competing, the latter seems more likely. Stated another way, it appears that participants may have associated *others* with competition more strongly after viewing an image of other people competing, and they may have associated others with cooperation more strongly after viewing an image of others cooperating. While this was not the expected result of the prime, it does make logical sense.

Research Question 2 asked whether any effects found for Research Question 1 would be augmented when the race of the participant matched the race of the individuals depicted in the image. Even though results were found in an unanticipated direction for Research Question 1, research question two was still investigated using an ANCOVA, with order of implicit tasks as the covariate. A significant main effect for race matching was found ($F(3, 84) = 5.49$, $p < .01$, $\eta^2 = .16$). An examination of the means revealed that the effects found in Research Question 1 were significantly augmented when participants' race matched the race of the individuals in the image, particularly in the strength of differences across conditions. The largest difference in IAT scores was found between cooperative and competitive conditions where the race of participants matched the race of the individuals depicted in the prime ($M_{diff} = .348$, $p < .01$). Differences in

IAT scores for participants who viewed others of their own race competing versus others of a different race cooperating approached significance (M_{diff} = .255, p = .074). In other words, when participants viewed someone similar to them either competing or cooperating, this created the strongest polarization in IAT scores between conditions.

This is in contrast to the results for the LDT, which found no significant effects of race matching on concept activation. In combination, these results lend more support to the notion that the primes may be affecting perceptions of the social environment rather than the individual's own state competitiveness. The effects of the primes on IAT scores that were discussed related to Research Question 1 still held when participants' race did not match the race of the individuals depicted in the image, but to a lesser degree.[2] There is also more separation between IAT scores in the cooperation condition (M_{diff} = .11); however, this difference was not significant. See Table 5 and Figures 1 and 2 for a summary of results for Research Questions 1 and 2. See Table 6 for a summary of all study means and standard deviations by condition.

[2] Due to potential differences in racial identification between white and non-white participants, an exploratory ANOVA was conducted to investigate whether the effects of racing matching were greater for non-white participants. No significant effects were found.

Table 5

Summary of Results for Research Questions 1-2: ANCOVA

Research Question	*n*	*F* (df)	Mean Diff	*p*	η^2
1. Main Effect of Primed Condition (Comp. vs. Coop.)	89	15.84 (1, 86)	.283	< .001	.16
1. Covariate (IAT Order) on Main Effect	89	1.60 (1, 86)	--	.209	.02
2. Interaction Effect of Race Matching	89	5.49 (3, 84)	.348[a]	< .01	.16
2. Covariate (IAT Order) on Interaction	89	1.37 (3, 84)	--	.245	.02

[a]Mean difference between coop. and comp. conditions where race matched

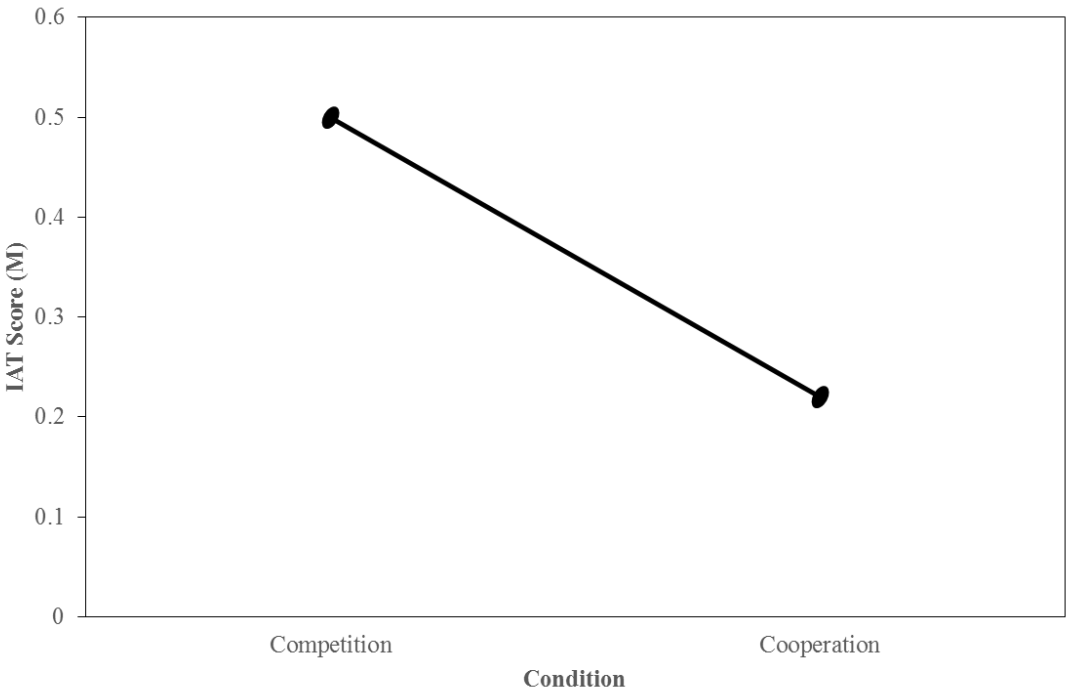

Figure 1. Results of Research Question 1. ANCOVA examining whether the prime resulted in stronger association of the primed concept with self or other.

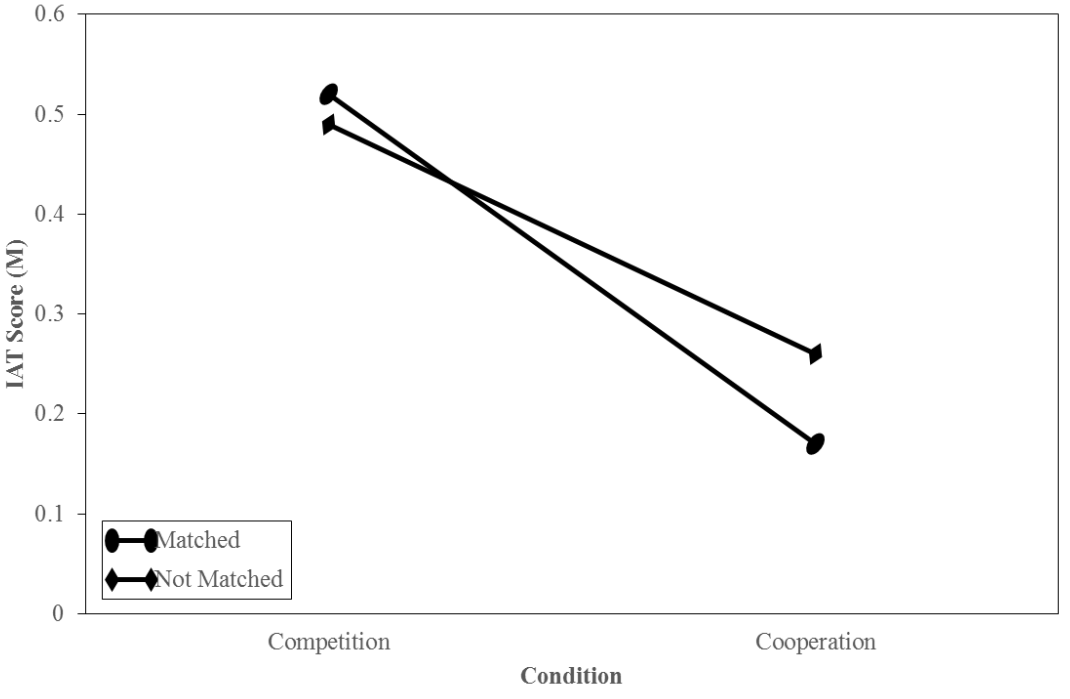

Figure 2. Results of Research Question 2. ANCOVA examining whether effects in Figure 1 are augmented when participants' race matches the race of individuals depicted in the prime.

Table 6
Summary of Means and Standard Deviations by Prime Condition and Whether Race of Participant Matched Image

	Competition Condition						Cooperation Condition					
	Matched			Not Matched			Matched			Not Matched		
Variable	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Target Word Latency	24	358.94	112.29	29	373.29	151.21	21	377.89	160.15	27	367.05	167.91
Neutral Word Latency	24	388.60	126.84	29	369.98	97.74	21	409.51	142.15	27	419.18	154.75
Non-Word Latency	24	436.65	166.47	29	401.76	105.34	21	426.28	145.87	27	430.22	136.03
Target Word Accuracy (%)	24	80.45	28.26	29	91.25	11.21	21	93.41	25.89	27	92.02	11.58
Neutral Word Accuracy (%)	24	80.13	22.45	29	83.55	14.05	21	79.85	22.88	27	81.20	13.21
Non-Word Accuracy (%)	24	79.01	32.32	29	91.38	12.15	21	90.11	25.24	27	89.60	11.13
IAT Score	22	0.51	0.28	25	0.49	0.38	18	0.16	0.35	24	0.27	0.33

Study 1 Results Summary

In summary, there was some indication that the competition prime increased concept activation of competition; however, rather than associating competition with the self, participants seemed to associate competition with *others.* Stronger evidence was provided that the cooperation prime increased concept activation for cooperation – significant differences were found on every indicator of concept activation. Again, participants seemed to show increased association of cooperation with *others*. Matching of race between the individuals in the prime images and the participant did not have significant effects on concept activation levels as assessed using the LDT. However, it did seem to moderate the extent to which the primes increased associations of the primed

concept with *others* according to the IAT. The difference in association of cooperation with *others* versus competition with others was significantly greater across conditions when races were matched.

In terms of the hypotheses, Hypothesis 1 regarding the impact of a competitive prime on competition concept activation received mixed support, while hypothesis 2 regarding the impact of a cooperative prime on cooperation concept activation was fully supported. Hypotheses 3 and 4 regarding the augmentation of the primes' effects on concept activation when participants' race matched the race of the individuals depicted in the image (as assessed using the LDT) were not supported. Significant results were found for research questions 1 and 2 (which examined race matching effects on IAT scores); however, results were not in the direction expected: it appears that the primes led participants to associate others more strongly with the primed concept rather than themselves. These effects were stronger when participants' race matched the race of the individuals depicted in the image in some instances.

Study 1 Discussion

Results of Study 1 contribute to the literature in several ways. First, they demonstrate the ability of a picture prime to activate a wider range of work-relevant concepts than have been studied in past research, specifically competition and cooperation. Future research should continue to expand the concepts studied, which could have broad implications for signage and images used in the workplace. Should future studies find similar results, it would suggest that images depicting, for example, organizational values, could influence how readily accessible these concepts are for

employees. Of course, this research would be even more impactful if a connection to behavior also exists. Study 2 will begin to explore whether or not this is the case.

Interestingly, Study 1 also uncovered evidence that can begin to help us understand the underlying mechanisms that make primes work. Past research using picture primes has not explored how varying the characteristics of the prime, such as demographic similarity to the viewer, impacts its effect. Past research has also not traditionally leveraged the IAT in measuring the effects of a prime. Several researchers have interpreted the effects of primes as impacting one's own concept activation (e.g., Bargh et al., 1996; Chen & Bargh, 1997; Shantz & Latham, 2009). However, the present research suggests that viewing a prime depicting other people impacts your automatic perceptions of others rather than those of yourself. This is more consistent with the results found by Cesario et al., (2006), which suggested that priming may prepare the individual to interact with others who demonstrate the primed concept. This suggests that a content-rich prime, like a picture, may be giving us additional information about our environment, which could in-turn impact how we respond to our environment. Again, Study 2 will begin to explore this, as well as the way that explicit behavioral expectations (i.e., goals) interact with the information communicated via a prime.

Lastly, there appears to be an element of racial identification in this effect: when the race of participants matched the race of the people depicted in the prime, the spread across the competitive and cooperative conditions was greatest and significantly different. This is supported, in part, by Social Identity Theory (Tajfel & Turner, 1979), and a plethora of social psychological research demonstrating that we are more likely to like and cooperate with members of our in-group. In a recent meta-analysis, Balliet, Wu,

and De Dreu (2014) found a small to medium effect (d = .32) for cooperation toward in-group members compared to out-group members. Future research could explore whether the effects found in the present study are moderated by racial identity. If they are, it could suggest that depicting a range of genders and ethnicities in images used in the workplace could be most effective by increasing the likelihood that an employee would be able to identify with at least one of the individuals in the image.

While the results of Study 1 begin to provide a window into some of the cognitive and implicit effects of the primes used in the present research, we do not yet know if and how these images impact behavior. Study 2 takes an important next step in furthering this research, while also addressing some of the primary limitations of Study 1: the lack of a control condition, the sample size, the lack of a behavioral measure, and replication of results. First, Study 2 attempts to replicate a portion of Study 1's results with the additional rigor of a control condition. The addition of a control condition will allow the researchers to better determine if the results found in Study 1 are truly a result of the picture primes used in the present research. Second, as described in more detail below, Study 2 includes a much larger sample size and therefore greater power to detect significant effects. Third, Study 2 introduces a behavioral measure to gauge the potential for these picture primes to impact cooperative and competitive behavior. Finally, the attempted replication of Study 1's results is important to address recent criticisms of implicit research: in recent years, much of the priming literature has come under criticism due to an inability to replicate some of the seminal work by Bargh and others (e.g., Doyen, Klein, Pichon, & Cleeremans, 2012; Pashler, Coburn, & Harris, 2012; Shanks et al., 2013). There are several explanations for this, including lack of a cohesive theory to

guide much of the priming research (Dijksterhuis, 2014), the fact that we should expect priming results to be sensitive to varying environmental factors (Cesario, 2014), and the potential for differing value of the primed goals to participants between original studies and replication attempts (Weingarten et al., 2016). The results of Study 1 begin to support the idea that the nuances of a prime can result in different effects on implicit associations. Study 2 furthers this vein of research by examining the effects of additional factors, specifically explicit goals, on concept activation, implicit associations, and behavior.

Study 2 Method

Sample

Participants were again recruited from Amazon's Mechanical Turk (MTurk) for Study 2. To be eligible to participate, workers were required to have an approval rating of at least 93 percent, have been approved for at least 50 prior studies, and be located in the United States. These qualifications were similar to those used in Study 1 and were implemented to help ensure data quality and reliability of the participant population. In total, 604 participants began the study and completed the first half, which was administered through Qualtrics. As described further in Data Screening, one participant was excluded from all analyses after requesting his/her data be removed following the study's debriefing. Three more participants were excluded because they did not answer enough questions for their data to be usable. This left 600 participants who had completed at least the first half of the study. This portion of the study included the resource dilemma task, which served as the measure of competitive and cooperative behavior central to many of Study 2's hypotheses. Therefore, this larger sample of 600

participants was used in testing any hypotheses where competitive or cooperative behavior was the outcome of interest.

Participants were 50.3% female, 49.2% male, and 0.5% non-binary. Seventy-six percent were White, 10% Black, 8% Asian, 3% Hispanic, and 3% another race. Just as in Study 1, the vast majority (98%) indicated English as their primary language. Participants were geographically dispersed across the United States, with the highest number in California (10%), New York (9%), and Florida (8%). The average age of participants was 37 (median 33), with an average of 15 years of work experience (median 12).

Only 455 participants completed at least some portion of part two of the study, which was administered through Inquisit. Based on participant comments submitted to the primary researcher via email, the high dropout rate was likely due to participants not being aware that Inquisit was required (it was not explicitly listed as required in the MTurk posting). Participants indicated they did not want to complete any research that required the use of Inquisit and had therefore discontinued their participation. Of the 455 participants who completed at least a portion of the Inquisit tasks, only 452 requested payment through MTurk and were compensated. This smaller sample of 455 participants was used in any hypothesis testing where implicit outcomes were of primary interest. The smaller sample was strikingly similar to the full sample demographically. These participants were 48.8% female, 50.5% male, and 0.7% non-binary. Seventy-six percent were White, 9% Black, 8% Asian, 3% Hispanic, and 4% other race. Ninety-seven percent indicated English as their primary language. They were still geographically dispersed across the United States, retaining the highest number in California (10%),

New York (10%), and Florida (7%). The average age of participants was again 37 (median 34), with the same average years of work experience as the full sample (15 years, median 12.5).

As indicated previously, 452 participants requested compensation and were paid for their participation. All were compensated a minimum of one dollar. They were also eligible to earn a bonus, as described in more detail below, based on their performance in the resource dilemma task. On average, participants earned a bonus of $2.28. The minimum bonus earned was $0, and the maximum bonus earned was $3.50. The median (and most common) bonus was $2.50. Thus, participants earned an average of $3.28 for their participation in the present study.

Procedure

The study design was a 3 (prime: competitive vs. cooperative vs. none) by 3 (explicit goal: competitive vs. cooperative vs. none) fully crossed design. Participants in both the full sample and smaller sample fell relatively evenly across the conditions, with between 10% to 12% in each of the nine conditions. In the full sample, the minimum number of participants in a condition was 63, and the maximum was 75. With the smaller sample, the minimum number of participants in a condition was 46, and the maximum was 56. While this does not achieve the recommended sample size of 143 participants per condition made in a recent meta-analysis, it does generally exceed more than twice the average in the published literature, which is 25 participants per condition (Weingarten, Chen, McAdams, Yi, Helper, & Albarracin, 2016).

Study 2's procedure mirrored that of Study 1, with a few exceptions. Similar to Study 1, participants completed Study 2 online using the Qualtrics survey platform and Inquisit by Millisecond software (Inquisit, 2016). After giving their informed consent to

participate, they completed basic demographic information, including gender, ethnicity, race, age, state of current residence, whether English is their primary language, and years of work experience. The gender information was again used to match their gender to that of the individuals depicted in the prime; however, unlike Study 1, only images depicting Caucasian men and women were used (see Appendix B). The effects of race matching were not a key element in Study 2; however, replication of Study 1's results was attempted using available data from the present sample, as described further in the Results section.

Participants were randomly assigned to a condition, viewed a cooperative prime, competitive prime, or no image, and then were asked to describe that image, if applicable. Following this, they participated in a resource dilemma task, which served as a behavioral measure of cooperation and competition. The explicit goal manipulation was included in the instructions of the resource dilemma task, and was also randomly assigned. Participants were asked two questions after reading the instructions, which were the same across conditions, to check their understanding of the game before proceeding. If a participant answered either of the understanding checks incorrectly, the instructions were presented a second time before participants proceeded to the resource dilemma task. Overall, 81% of participants answered both understanding questions correctly. After the behavioral measure, participants completed the same implicit measures that were used in Study 1 (the LDT and IAT), the order of which again varied randomly. As mentioned when describing the sample, the behavioral measure was completed first (in Qualtrics) so as not to further prime participants or cause the prime to become conscious through completion of the implicit tasks. Finally, participants

completed a funneled debriefing, and were debriefed on the resource dilemma task. As part of this debriefing, participants were asked to report whether they actively participate in MTurk message boards. Notably, of those who participated in message boards, none had read anything material about the study prior to completing it. Those that had read any information about the study only mentioned the amount of time it took to complete, the amount of money it paid, and that Inquisit was required. Finally, participants were presented with the prime again, and rated how much they liked the individuals depicted in the photos, and how similar they perceived themselves to be to those individuals.

Manipulations

Implicit goal manipulation. The implicit goal manipulation occurred through the image participants viewed after completing their demographic information. As stated earlier, participants were matched based on gender (e.g., women viewed an image of all women either cooperating or competing). Any participants who indicated Other/Non-binary as their gender also saw an image depicting women; randomization based on this response was not possible due to limitations of the survey software. Condition (competitive vs. cooperative vs. none), however, was randomly assigned. See Appendix B for all images used in the present research.

Explicit goal manipulation. The explicit goal manipulation was included in the title and instructions for the resource dilemma task. Those in the competitive goal condition were told that the game was called Battle of Wits: a competitive game in which players should keep their own interests in mind. Those in the cooperative goal condition were told that the game was called The Community Game: a cooperative game in which players should keep the collective benefit of the group in mind. Participants in the

neutral goal condition received only standard instructions to the task. See Appendix D for full instructions across all conditions, with condition manipulations highlighted.

Materials and Measures

Competitive vs cooperative behavior. A version of the Ultimatum Game (Guth, Schmittberger, & Schwarze, 1982) served as a measure of competitive and cooperative behavior. In the Ultimatum Game, two players must agree upon how to split a sum of money. One player is the proposer and the other is the responder. The proposer makes an offer of how to split the money. If the responder agrees, the deal goes ahead. If the responder rejects, the game is over. In the present study, participants always played the role of the proposer. They were told that they were making an offer to another participant, which the participant could choose to either accept or reject. Unbeknownst to participants, the responding participant was actually fictional. The behavioral measure of interest was how the participant chose to split five dollars between him or herself and the responding "participant" over the course of two rounds of the game.

Participants were given instructions as outlined above, which differed depending on their explicit goal condition, and answered two questions to check their understanding of the instructions. Participants then saw a screen that said "Waiting for Another Participant to Join", giving the impression that they were playing against another person. This screen automatically advanced after a few seconds. Participants were then told they were the proposer and asked to enter an offer for how to split $2.50 between themselves and the other participant. Participants completed two rounds of the game, splitting a total of five dollars. While data from the first round was of primary interest in analyses for the present study, including two rounds allowed the researchers to examine if and how behavior changed over time.

In each round, participants were asked to enter amounts in increments of 25 cents. The task was programmed such that the other "participant" always accepted offers greater than or equal to 75 cents and always rejected offers less than 75 cents. This pre-programmed behavior is consistent with results from actual participants in Ultimatum Game research; researchers have found that about half of responders reject offers in which they would receive less than 30 percent of the total dollar amount being allocated between participants (Yamagishi et al., 2012). The task repeated for two rounds and then ended. Based on how they performed in the task, participants were eligible for a compensation bonus up to the actual dollar amount they received in the Ultimatum Game. The minimum (base) compensation for the study was one dollar with the potential for a bonus of up to $3.50. This was done in an effort to increase the fidelity of the behavioral outcome measure.

Concept activation. The same LDT and IAT used in Study 1 were used in Study 2 to measure concept activation.

Supplemental items. Several supplemental items were included as attention checks or for use in exploratory analyses. See Appendix E for a full list of supplemental items.

Study 2 Results

Data Screening

Before proceeding with analysis of the hypotheses, the data were cleaned and screened for outliers and normality. See Tables 9, 10, and 11 for descriptive statistics and correlations of all variables relevant for Study 2 (hypotheses 5 and 6, research question 3). As noted when describing the sample, one participant who requested his or her data

be removed and three participants who did not have enough usable data were removed prior to analyses. This left 600 participants in the full sample with the explicit outcome and 455 in the smaller sample that included implicit and supplemental measures.

As in Study 1, all accuracy measures in the LDT for target words, neutral words, and non-words were significantly kurtotic (kurtosis statistics of 4.55, 3.07, and 4.40 respectively). Again, this was expected, and these variables were not transformed in any analyses. Unlike in Study 1, however, there were also significant kurtosis issues with the latency measures in the LDT for target, neutral, and nonwords (kurtosis statistics of 24.87, 126.56, and 433.73 respectively). Upon further examination, the issues with normality were primarily driven by a handful of outliers in the data where participants took several seconds, and in one case a full minute, to respond to the words presented during the LDT. Rather than transform the data to deal with the issues of normality, these eight participants' LDT data were removed. These participants' z-scores were more than four standard deviations above the mean across one or more latency measures. This led to a significant correction in the normality of the data resulting in new kurtosis statistics of 7.78 for target words, 10.98 for neutral words, and 9.89 for nonwords. These eight participants were therefore excluded from any analyses where the LDT was an outcome of interest. No further outliers or normality issues were identified in any other variables.

Just as in Study 1, IAT scores were calculated according to the *D* scoring procedure (Greenwald et al., 2003). After cleaning the IAT data, an ANOVA was conducted to test for IAT order effects across conditions to determine if the word-pairings that were presented first (self and cooperation or self and competition) impacted

overall IAT scores. There was no main effect for order ($F(1, 439) = 4.28$, $p = .174$, $\eta^2 = .68$), or significant interaction between order and condition ($F(2, 439) = 1.95$, $p = .144$, $\eta^2 = .01$), so the overall IAT score was used in subsequent analyses.

Next, potential gender differences in outcome variables were examined. No significant effects were found, so gender was collapsed within the cooperation, competition, and neutral conditions for all subsequent analyses. See Table 12 for a summary of these screening analyses.

All implicit outcomes were also examined for effects due to the order of implicit tasks (i.e., whether the LDT or IAT was completed first). Similar to Study 1, there was a significant main effect of order on IAT scores ($F(1, 430) = 22.14$, $p < .05$). However, the overall effect was in the opposite direction found in Study 1. In this case, participants who completed the LDT first had significantly more positive d scores ($M = .30$) than those who completed the IAT first ($M = .22$). While this pattern held within each condition, the interaction between order and condition was not significant ($F(2, 426) = .197$, $p = .821$). Still, implicit task order was used as a control variable when IAT scores were the outcome of interest.

Order effects on LDT scores were examined next. No significant order effects were found in any of the LDT latency measures or for target or neutral word accuracy. For nonword accuracy, results approached significance. For nonwords, accuracy scores were higher when the LDT was completed first. Since the results regarding effects on the LDT were mixed, and LDT scores are assessed as a within-subjects variable, implicit task order was not used as a control variable in analyses involving the LDT. See Table 13 for a summary of implicit task order screening analyses.

Lastly, IAT scores in the neutral condition were examined to determine if the LDT participants completed, which was randomly assigned, had any impact on their IAT scores. In this case, there was a significant effect ($t(150) = 2.05$, $p < .05$): participants who completed the LDT with cooperative words had significantly more positive IAT scores ($M = .35$) than those who completed the LDT with competitive words ($M = .21$). In other words, participants who completed an LDT with cooperative words associated themselves more strongly with competition and others more strongly with cooperation. However, because LDT type has high multicollinearity with condition outside of the neutral condition, it was not used as a control variable. Instead, order of implicit tasks was used in an effort to control for any effects the LDT may have had on IAT scores when it was completed first.

Table 9

Descriptive Statistics for Hypothesis 5-6, Research Question 3 – Explicit Outcomes

Explicit Condition	Variable	Competition Prime			Cooperation Prime			Neutral Prime			Total (Implicit Collapsed)		
		n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Competitive Goal	Round 1 Offer	63	$1.10	$0.36	63	$1.17	$0.23	75	$1.11	$0.32	201	$1.13	$0.31
	Round 2 Offer	63	$1.20	$0.23	63	$1.17	$0.23	75	$1.15	$0.23	201	$1.17	$0.23
	Total Bonus Received	63	$2.32	$0.65	63	$2.43	$0.49	75	$2.45	$0.60	201	$2.41	$0.58
Cooperative Goal	Round 1 Offer	72	$1.14	$0.29	65	$1.14	$0.28	64	$1.11	$0.30	201	$1.13	$0.29
	Round 2 Offer	72	$1.20	$0.31	65	$1.20	$0.25	64	$1.18	$0.21	201	$1.19	$0.26
	Total Bonus Received	73	$2.42	$0.61	65	$2.43	$0.47	64	$2.45	$0.53	201	$2.44	$0.54
No Goal	Round 1 Offer	68	$1.09	$0.33	65	$1.12	$0.26	65	$1.12	$0.34	198	$1.11	$0.31
	Round 2 Offer	68	$1.16	$0.25	65	$1.17	$0.25	65	$1.18	$0.21	198	$1.17	$0.25
	Total Bonus Received	68	$2.36	$0.64	65	$2.45	$0.46	65	$2.34	$0.56	198	$2.38	$0.56
Total (Explicit Collapsed)	Round 1 Offer	203	$1.11	$0.32	193	$1.14	$0.26	204	$1.11	$0.32	600	$1.12	$0.30
	Round 2 Offer	203	$1.18	$0.27	193	$1.18	$0.25	204	$1.17	$0.21	600	$1.18	$0.24
	Total Bonus Received	203	$2.37	$0.63	193	$2.41	$0.56	204	$2.42	$0.56	600	$2.41	$0.56

Table 10
Descriptive Statistics for Hypothesis 5-6, Research Question 3 – Implicit Outcomes

Explicit Condition	Variable	Competition Prime			Cooperation Prime			Neutral Prime			Total (Implicit Collapsed)		
		n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Competitive Goal	Target Word Latency	44	354.05	177.84	47	375.10	223.30	56	360.05	157.93	147	363.06	185.73
	Neutral Word Latency	44	375.60	170.08	47	439.16	245.61	56	408.30	159.78	147	408.38	194.35
	Nonword Latency	44	421.49	242.68	47	428.31	181.68	56	424.49	188.14	147	424.84	202.70
	Target Word Accuracy (%)	44	81.47	25.40	47	87.40	22.37	56	88.87	20.32	147	86.19	22.65
	Neutral Word Accuracy (%)	44	76.40	24.52	47	75.12	21.35	56	81.46	17.89	147	77.92	21.20
	Nonword Accuracy (%)	44	81.03	26.74	47	82.16	24.61	56	86.13	22.31	147	83.33	24.37
	IAT Score	46	.17	.43	47	.33	.40	56	.32	.39	149	.28	.41
Cooperative Goal	Target Word Latency	45	354.17	225.14	51	330.04	143.51	45	332.11	154.41	141	338.40	175.78
	Neutral Word Latency	45	381.66	250.73	51	410.52	252.48	45	359.00	148.70	141	384.87	223.45
	Nonword Latency	45	409.18	222.29	51	435.42	299.80	45	386.50	164.46	141	411.43	237.78
	Target Word Accuracy (%)	45	70.77	33.51	51	81.45	30.89	45	87.35	19.96	141	79.92	29.40
	Neutral Word Accuracy (%)	45	66.84	30.54	51	74.36	23.57	45	82.22	17.11	141	74.47	24.93
	Nonword Accuracy (%)	45	71.71	32.46	51	78.05	30.14	45	87.52	13.90	141	79.05	27.51
	IAT Score	47	.19	.50	53	.26	.34	45	.25	.36	145	.23	.41
No Goal	Target Word Latency	49	338.77	207.56	46	330.59	138.98	53	333.52	126.56	148	334.35	160.18
	Neutral Word Latency	49	365.72	236.32	46	395.19	144.57	53	392.38	165.71	148	384.43	185.80
	Nonword Latency	49	400.00	252.05	46	416.35	166.41	53	394.56	155.27	148	403.13	194.51
	Target Word Accuracy (%)	49	86.03	22.85	46	92.31	16.22	53	86.79	23.82	148	88.25	21.43
	Neutral Word Accuracy (%)	49	83.99	21.29	46	80.77	20.63	53	77.36	20.76	148	80.61	20.94
	Nonword Accuracy (%)	49	85.09	24.85	46	87.12	16.70	53	88.75	17.36	148	87.03	19.90
	IAT Score	49	.21	.43	48	.30	.34	54	.26	.46	151	.25	.41
Total (Explicit Collapsed)	Target Word Latency	138	348.66	203.36	144	345.34	172.52	154	342.76	146.42	436	345.34	174.23
	Neutral Word Latency	138	374.07	221.09	144	414.97	220.44	154	388.42	158.97	436	392.65	201.34
	Nonword Latency	138	409.88	238.10	144	427.00	225.44	154	403.09	170.21	436	413.13	211.79
	Target Word Accuracy (%)	138	79.60	28.06	144	86.86	24.44	154	87.71	21.37	436	84.86	24.48
	Neutral Word Accuracy (%)	138	75.97	26.41	144	76.65	21.97	154	80.27	18.71	436	77.72	22.48
	Nonword Accuracy (%)	138	79.43	28.48	144	82.29	24.78	154	87.44	18.39	436	83.20	24.24
	IAT Score	142	.19	.45	148	.29	.36	155	.28	.41	445	.26	.41

Table 11

Pearson Correlations Among All Implicit and Explicit Outcomes[ab]

Variable	1	2	3	4	5	6	7	8	9	10
1. Round 1 Offer	-	.217**	.403**	.137	.008	.026	.172**	.475**	.424**	.183*
2. Round 2 Offer	.360**	-	-.158*	-.008	.008	.033	.039	.064	-.053	.090
3. Total Bonus Received	.502**	.180*	-	-.030	-.067	-.100	.034	.310**	.282**	.161
4. IAT Score	-.022	-.020	-.024	-	-.066	.026	-.080	-.014	.027	.005
5. Target Word Latency	.067	.007	.055	-.075	-	.653**	.635**	.029	.043	.054
6. Neutral Word Latency	.103	.042	.030	-.084	.699**	-	.623**	.052	.050	.043
7. Nonword Latency	.076	-.001	.030	-.031	.672**	.641**	-	.181*	.133	.105
8. Target Word Accuracy	.246**	-.083	.145	.180*	.059	-.020	.055	-	.850**	.754**
9. Neutral Word Accuracy	.215**	-.224**	.187*	.216**	.133	.108	.118	.783**	-	.651**
10. Nonword Accuracy	.103	-.009	.037	.210*	-.067	-.076	-.001	.740**	.622**	-

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

[a]Below the diagonal: correlations for the competitive goal condition

[b]Above the diagonal: correlations for the cooperative goal condition

Table 12
Summary of Screening Analyses for Gender Effects on Implicit and Explicit Outcomes

Variable	*n*	*F* (df)	*p*	η^2
Round 1 Offer	600	.88 (2,597)	.415	.00
Round 2 Offer	600	.73 (2, 597)	.484	.00
Total Bonus Received	600	1.92 (2, 597)	.147	.01
Target Word Latency	436	1.67 (2, 433)	.190	.01
Neutral Word Latency	436	2.15 (2, 433)	.118	.01
Non-Word Latency	436	.19 (2, 433)	.829	.00
Target Word Accuracy (%)	436	1.19 (2, 433)	.305	.01
Neutral Word Accuracy (%)	436	1.86 (2, 433)	.158	.01
Non-Word Accuracy (%)	436	.56 (2, 433)	.570	.00
IAT Score	445	1.28 (2, 442)	.279	.01

Table 13
Summary of Screening Analyses for Order of Implicit Measures Effects

Variable	*n*	*F* (df)	*p*	η^2
Target Word Latency	425	2.22 (1, 423)	.137	.01
Neutral Word Latency	425	.03 (1, 423)	.866	.00
Non-Word Latency	425	.22 (1, 423)	.639	.00
Target Word Accuracy (%)	425	.03 (1, 423)	.865	.00
Neutral Word Accuracy (%)	425	1.16 (1, 423)	.282	.00
Non-Word Accuracy (%)	425	2.78 (1, 423)	.096	.01
IAT Score	432	4.66 (1,430)	< .05	.01

Study 1 replication

While not directly hypothesized in Study 2, analyses completed in Study 1 related to the primes' effect on concept activation were repeated for Study 2 in order to demonstrate replicability. First, the effects of the prime on concept activation were examined through a series of RM-ANOVAs, starting with the competitive prime condition, and without regard to whether the race of participants matched the race of those depicted in the prime. Recall that Study 1 demonstrated mixed support for the primes' ability to impact concept activation as measured by LDT latency and accuracy scores. As in Study 1, there was a significant main effect for latency ($F(2, 274) = 12.25$, $p < .001$, $\eta^2 = .08$). After viewing a competitive prime, participants identified

competitive words (M = 348.66 milliseconds) significantly faster than neutral words (M = 374.07, $p < .05$), and significantly faster than non-words (M = 409.88, $p < .01$).

Next, within subjects' effects for accuracy were examined. Results for accuracy were mixed, just as they were in Study 1. Mauchly's Test of Sphericity was significant ($p < .001$), so adjusted degrees of freedom were used in significance testing for main effects. The main effect for accuracy approached significance ($F(1.54, 211.38) = 2.81$, $p = .076$, $\eta^2 = .02$). After viewing a competitive prime, participants identified competitive words (M = 79.60%) with significantly higher accuracy then neutral words (M = 76.00%, $p < .05$), but with no significant difference compared to nonwords (M = 79.40%, $p = .928$).

In the cooperative condition, there was again a significant main effect for latency (using adjusted degrees of freedom, because Mauchly's Test of Sphericity was significant ($p < .01$)) ($F(1.86, 267.27) = 15.29$, $p < .001$, $\eta^2 = .10$). Participants identified cooperative words (M = 344.92 milliseconds) significantly faster than neutral words (M = 414.97, $p < .001$) and nonwords (M = 427.00, $p < .001$). Further, the main effect for accuracy was significant ($F(1.68, 240.94) = 26.00$, $p < .001$, $\eta^2 = .15$), and participants identified cooperative words (M = 86.90%) with significantly higher accuracy than neutral words (M = 76.70%, $p < .001$) and nonwords (M = 82.30%, $p < .001$).

At first glance, this provides corroborative, albeit still slightly mixed, evidence of the primes' ability to impact implicit concept activation for both cooperation and competition. The pattern of results in the competitive and cooperative conditions mirrors that found in Study 1. However, Study 2 had the added benefit of a control condition where participants did not view a prime. For these participants, RM-ANOVAs were

conducted for latency and accuracy scores as the within-subjects variables and LDT type (cooperative or competitive) as the between subjects' variable. Interestingly, similar patterns of results were found in the neutral condition as had been found in the competitive and cooperative conditions in both Study 1 and Study 2. In the neutral condition, there was a significant main effect for latency ($F(2, 298) = 20.21$, $p < .001$, $\eta^2 = .12$). Participants identified target words (both competitive and cooperative, $M = 342.54$ milliseconds) significantly faster than neutral words ($M = 388.42$ milliseconds, $p < .001$) and nonwords ($M = 401.87$, $p < .001$). There was no significant main effect for LDT type, so this pattern held regardless of the specific category of target words seen ($F(1.86, 267.27) = 15.29$, $p < .001$, $\eta^2 = .10$). What's more, when comparing latency scores across conditions, there were no significant main effects ($F(2, 433) = .50$, $p = .607$, $\eta^2 = .00$). In other words, the time it took to identify similar categories of words (e.g., target words across conditions) did not differ based on the prime.

In the neutral condition, participants also identified target words with significantly higher accuracy compared to neutral words, regardless of LDT type. There were no significant differences in accuracy between target words and nonwords. Interestingly, when looking at accuracy scores across conditions, there was a significant main effect ($F(2, 433) = 3.62$, $p < .05$, $\eta^2 = .02$). Post-hoc tests revealed that accuracy was significantly *lower* in the competitive condition compared to the neutral condition ($M_{diff} = .07$, $p < .05$), the opposite of what one might have expected. There were no significant differences between any other conditions.

Taken together, these results suggest the possibility of a natural pattern in LDT results that is not related to the prime (or lack thereof) that participants viewed.

Regardless of condition, participants generally identified target words faster and with higher accuracy. In addition, participants in the competitive condition had significantly less accurate responses overall than those in the neutral condition. Neither of these patterns support the ability of the prime to increase concept activation, at least as measured by the LDT. Because of this, LDT scores were not examined further, as these results do not appear to actually be meaningfully related to the prime that was viewed. See Table 14 for a summary of LDT results across Study 2's competitive, cooperative, and neutral prime conditions.

Table 14
Summary of Study 1 Replication: Prime's Effect on Concept Activation as Measured by the LDT (shorter latency and higher accuracy for identification of target words)

	Competition Prime				Cooperation Prime				Neutral Prime			
Variable	*n*	*F* (df)	*p*	η^2	*n*	*F* (df)	*p*	η^2	*n*	*F* (df)	*p*	η^2
Latency	138	12.25 (2.00, 274.00)	< .001	.08	144	15.29 (1.87, 267.27)[a]	<.001	.10	151	20.21 (2.00, 298.00)	<.001	.12
Accuracy	138	2.81 (1.54, 211.38)[a]	.076	.02	144	25.99 (1.69, 240.94)[a]	<.001	.15	151	27.25 (1.90, 283.02)[a]	<.001	.15
	Main Effect for Latency or Accuracy				Main Effect for Condition				Interaction Between Variable & Condition			
Latency	436	43.88 (1.96, 849.27)[a]	<.001	.09	436	.50 (2, 433)	.607	.00	436	1.62 (3.92, 849.27)[a]	.167	.00
Accuracy	436	40.56 (1.78, 768.36)[a]	< .001	.09	436	3.62 (2, 433)	<.05	.02	436	3.34 (3.55, 768.36)[a]	<.05	.02

[a]Greenhouse-Geisser correction for degrees of freedom used due to violation of sphericity (significant Mauchly's Test of Sphericity)

In Study 1, exploratory analyses were conducted to determine the primes' impact on IAT scores and how strongly participants associated competition with themselves compared to others. The type of LDT participants completed in the neutral condition had an impact on IAT scores; however, due to the high multicollinearity between LDT type and condition, implicit task order was used as a control variable instead to account for any effects the LDT may have had on the IAT. An ANCOVA was conducted where overall IAT score was the outcome, condition was the between-subjects factor, and order of implicit tasks was the covariate. There was a significant main effect for order of implicit tasks ($F(1, 428) = 4.31$, $p < .05$, $\eta^2 = .01$), and a significant main effect for condition ($F(2, 428) = 3.02$, $p = .05$, $\eta^2 = .01$). Participants who viewed a competitive prime had significantly less positive IAT scores compared to participants who viewed no prime ($M_{diff} = .09$, $p = .05$) and significantly less positive IAT scores compared to participants who viewed a cooperative prime ($M_{diff} = .11$, $p < .05$). Interestingly, this is in the opposite direction of results found in Study 1. In this

case, participants who viewed a competitive prime associated themselves with competition more compared to participants who viewed a cooperative prime or no prime.

In summary, similar results for LDT latency and accuracy were found in Studies 1 and 2; however, the addition of a neutral condition in Study 2 revealed that these effects may, in fact, not be related to the prime participants viewed, but perhaps to a natural tendency of participants to identify the target words more quickly and with higher accuracy. The explanation for this is unknown; however, it could be that these words were just easier to identify than the neutral or nonwords. Further, the effects on IAT scores found in Study 1 were not replicated in Study 2. Rather, significant results were found, but in the opposite direction as what was found in Study 1. This may, however, be attributable to the design of Study 2: because the behavioral measure was of primary interest in this study, participants completed it before completing any implicit measures. It is possible that the length of time between the prime and the IAT negated any effects on participants' association of themselves (or others) with the primed concepts. Further, the effect that was found on IAT scores may be from the LDT instead of from the prime. Evidence for this is found in the neutral condition, where participants who completed the competitive LDT had significantly less positive IAT scores (i.e., associated themselves more strongly with competition). This idea is further supported by the fact that the moderation found in Study 1 was not replicated in Study 2: whether or not the race of participants matched the race of the individuals depicted in the prime did not differentially affect IAT scores ($F(1, 425) = .07$, $p = .819$, $\eta^2 = .03$). This would make sense if the effect is actually from the LDT, which is strictly a word-driven task that provides to additional racial-identity context.

It is also possible that the prime's impact on the IAT was negated by the Ultimatum Game task itself, specifically when it was not consistent with the original prime. To further examine this possibility, an ANCOVA was repeated, controlling for implicit task order, using only participants who received a congruent implicit and explicit goal. There was again a significant main effect for implicit task order ($F(1, 142) = 5.77$, $p < .05$, $\eta^2 = .04$), but this time no main effect for condition on IAT scores ($F(2, 142) = .79$, $p = .457$, $\eta^2 = .01$). An ANCOVA was also repeated for participants who had incongruent implicit and explicit goals. Interestingly, in this case, there was no main effect for implicit task order ($F(1, 282) = .72$, $p = .398$, $\eta^2 = .00$), but the main effect for condition approached significance ($F(1, 282) = 2.47$, $p = .087$, $\eta^2 = .02$). Post-hoc tests revealed that participants who viewed a competitive prime had significantly less positive IAT scores than those who viewed a cooperative prime ($M_{diff} = .13$, $p < .05$). In order to shed more light on how the IAT scores differ across conditions, mean response latencies for both congruent (me + cooperative) and incongruent (me + competitive) pairings within each block of the IAT are summarized in Table 15.

Table 15

Average Latencies in Each Task Block by Explicit and Primed Goal Conditions[ab]

Explicit Condition	IAT Block	Competition Prime			Cooperation Prime			Neutral Prime			Total (Implicit Collapsed)		
		n	*M*	*SD*	*N*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Competitive Goal	Block 1 – Congruent	46	858.19	342.11	47	784.16	319.02	56	786.90	318.64	149	808.04	325.70
	Block 1 – Incongruent	46	930.04	369.59	47	925.58	381.88	56	958.63	411.05	149	939.38	387.14
	Block 2 – Congruent	46	777.65	263.66	47	722.11	275.08	56	747.72	289.59	149	748.88	276.23
	Block 2 – Incongruent	46	837.85	359.07	47	818.80	325.27	56	817.08	303.74	149	824.03	326.28
Cooperative Goal	Block 1 – Congruent	47	783.34	361.40	53	822.50	303.62	45	835.59	338.02	145	813.87	332.27
	Block 1 – Incongruent	47	836.28	445.40	53	925.90	322.42	45	890.55	322.06	145	885.88	366.06
	Block 2 – Congruent	47	674.91	289.20	53	739.16	240.91	45	736.34	262.08	145	717.46	263.70
	Block 2 – Incongruent	47	745.49	364.27	53	821.55	271.30	45	834.46	278.95	145	800.90	307.01
No Goal	Block 1 – Congruent	49	874.00	397.48	48	773.38	255.74	54	800.41	301.93	151	815.70	324.08
	Block 1 – Incongruent	49	976.86	476.40	48	921.23	325.24	54	926.54	415.94	151	941.18	409.29
	Block 2 – Congruent	49	788.66	305.75	48	740.40	248.01	54	750.90	299.39	151	759.81	285.09
	Block 2 – Incongruent	49	852.42	360.18	48	820.23	245.97	54	841.14	343.62	151	838.15	319.94
Total (Explicit Collapsed)	Block 1 – Congruent	142	838.87	367.87	148	794.39	292.97	155	805.74	317.30	445	812.54	326.59
	Block 1 – Incongruent	142	915.16	434.79	148	924.28	340.93	155	927.68	387.65	445	922.56	388.16
	Block 2 – Congruent	142	747.44	289.72	148	734.15	252.87	155	745.52	283.66	445	742.35	275.26
	Block 2 – Incongruent	142	812.31	361.75	148	820.25	280.16	155	830.50	309.72	445	821.29	317.60

[a]Congruent blocks: me + cooperation
[b]Incongruent blocks: me + competition

Study 2 primary analyses

Despite the inability to replicate Study 1's results, the primary hypotheses and research questions in Study 2 were still examined. Hypotheses 5a and 5b stated that viewing a cooperative or competitive image would lead participants to behave more (a) cooperatively or (b) competitively compared to a control condition. To test these hypotheses, results were collapsed across explicit

goal conditions, and an ANOVA was conducted using offers made in round one of the Ultimatum Game to examine main effects of the primes. Hypothesis 5 was not supported. Offer amounts made in the first round did not vary significantly based on the prime that participants viewed ($F(2, 597) = .60$, $p = .551$).

It is possible these results were muddied by collapsing the analysis across all explicit conditions. To further isolate the potential effects of the prime, this analysis was repeated with only participants who received neutral instructions to the Ultimatum Game. Still, results were not significant ($F(2, 195) = .17$, $p = .844$). Even without explicit instructions to behave in a certain way, the prime did not impact behavior in the first round of the Ultimatum Game. Further exploratory analyses were conducted on offers participants made in round two of the game, and the total bonus participants received. Again, no significant effects on behavior were found. See Table 16 for a summary of all results related to Hypothesis 5.

Table 16
Summary of the Prime's Effect on Behavior in the Ultimatum Game

Variable	*n*	*F* (df)	*p*	η^2
Round 1 Offers	600	.60 (2, 597)	.551	.00
Round 1 Offers (No Explicit Goal Only)	198	.20 (2, 195)	.844	.00
Round 2 Offers	600	.30 (2, 597)	.739	.00
Round 2 Offers (No Explicit Goal Only)	198	.08 (2, 195)	.921	.00
Total Bonus Received	600	.75 (2, 597)	.473	.00
Total Bonus Received (No Explicit Goal Only)	198	.70 (2, 195)	.496	.01

Hypotheses 6a through 6d focused on the interaction between explicit and implicit goals, and stated that, when explicit and implicit goals were consistent, the effect on (a) competitive construct activation, (b) competitive behavior, (c) cooperative construct activation, and (d) cooperative behavior would be significantly greater. Further,

Research Question 3 asked what would occur when explicit and implicit goals were conflicting.

Because the results for Hypothesis 5 revealed that the prime, or implicit goal, had no standalone effect on behavior, it became pertinent to examine whether the Ultimatum Game instructions, or explicit goal, had any isolated effect. Therefore, the standalone effects of explicit goal condition were examined prior to testing any components of Hypothesis 6. To do so, results were collapsed across all implicit goal conditions, and a series of ANOVAs were conducted to examine effects of task instructions on round one offers, round two offers, and total bonuses received. These effects were examined with results collapsed across all implicit conditions, and within the neutral (no prime) condition only. Once again, no significant effects were found. Behavior in the Ultimatum Game did not differ significantly based on the explicit goal given through the instructions of the task. See Table 17 for a summary of these results.

Table 17

Summary of the Game Instructions' Effect on Behavior in the Ultimatum Game

Variable	*n*	*F* (df)	*p*	η^2
Round 1 Offers	600	.19 (2, 597)	.824	.00
Round 1 Offers (Neutral Prime Only)	204	.04 (2, 201)	.958	.00
Round 2 Offers	600	.62 (2, 597)	.539	.00
Round 2 Offers (Neutral Prime Only)	204	.34 (2, 201)	.715	.00
Total Bonus Received	600	.46 (2, 597)	.631	.00
Total Bonus Received (Neutral Prime Only)	204	.98 (2, 201)	.378	.01

Despite this, an ANOVA was still conducted to test Hypotheses 6b, 6d, and Research Question 3b to see if there were interactive effects between implicit and explicit goal condition on cooperative and competitive behavior. Not surprisingly, no significant main effects or interactions were found in either round of offers or in the total bonus participants received (see Table 18).

Table 18
Summary of Interactive Effects of Prime and Game Instructions on Behavior in the Ultimatum Game

		Main Effect for Game Instructions			Main Effect for Prime			Interaction Between Game Instructions & Prime		
Variable	*n*	*F* (df)	*p*	η^2	*F* (df)	*p*	η^2	*F* (df)	*p*	η^2
Round 1 Offer	600	.51 (2, 591)	.633	.20	1.64 (2, 591)	.301	.45	.38 (4, 591)	.825	.00
Round 2 Offer	600	1.78 (2, 591)	.280	.47	.84 (2, 591)	.496	.30	.32 (4, 591)	.864	.00
Total Bonus Received	600	.86 (2, 591)	.490	.30	1.43 (2, 591)	.330	.42	.55 (4, 591)	.700	.00

Because no meaningful effects were found on concept activation (as measured by the LDT) based on the prime participants viewed, further interactive effects between implicit and explicit goal condition on LDT latency and accuracy scores were not examined. Interactive effects between implicit and explicit goal condition were examined for the IAT; however, no significant interaction was found ($F(4, 436) = .26$, $p = .905$, $\eta^2 = .00$). Overall, no support was found for Hypothesis 6 and no meaningful results were found for Research Question 3.

Study 2 Discussion

Unfortunately, Study 2's hypotheses were not supported. This study was not able to demonstrate a connection between the explicit goal manipulation used in the present research and cooperative and competitive behavior, as measured by an Ultimatum Game task. Further, Study 1's results were not replicated, and interactive effects between implicit and explicit goals were not found. While this is discouraging, there are several limitations in the present study's design that could account for some of these effects. As

previously noted, the inability to replicate effects on IAT scores found in Study 1 may be due to the length of time or number of tasks between the prime and completion of the IAT. Because the effect found in Study 2 was actually consistent with the LDT participants completed, it could also be due to the LDT itself. Future research could attempt a pure replication of Study 1, with the addition of a neutral condition, but without interference from a behavioral measure, to further our theoretical understanding of how primes impact our association of the primed concept with ourselves versus others. Future research could also examine effects on IAT scores alone, without including a measure like the LDT, to isolate the effects of the picture prime from potential extraneous effects related to completing other tasks.

As it pertains to the lack of effect on cooperative and competitive behavior, there are several possible factors at play. First, the variability in offers made during the Ultimatum Game was restricted. The majority (66%) of participants split the money 50/50 in round one of the game, and slightly more participants (68%) split it down the middle in round two. Further, the Ultimatum Game is inherently a better measure of competition than cooperation due to the low likelihood that participants would offer to give away more than half of the money. This held true in the current sample: less than six percent of participants offered to give away more than half of the money in round one, and less than two percent of participants did in round two. Finally, participants were asked to enter their offers in increments of 25 cents. While not everyone did, this further limited the variance in the data, and may not have been enough variability to find significant effects by condition. Future research could explore measuring cooperative or

competitive behavior using different outcome measures that have more variability and that do not attempt to measure these two different behaviors on a continuum.

A second factor that could have contributed to the lack of effect was the explicit manipulation itself. While it has been referred to throughout the present study as an explicit goal manipulation, it was not framed as a difficult or specific goal. The instructions to the tasks were clear, as demonstrated by the high accuracy in understanding checks, but better represent a "do your best goal," which research has clearly demonstrated is less effective than specific and difficult goals (Locke & Latham, 1990). In other words, the explicit manipulation may not have been strong enough, particularly with real money on the line for participants.

This leads to the final factor that may have impacted Study 2's results: the fact that participants were playing for real money. This was an intentional part of the study design, done to ensure the behavior participants exhibited during the study was authentic; however, it is possible that this unintentionally became the strongest manipulation in the study. Participants' desire to, first, earn a reasonable bonus for themselves, and, second, fairly distribute the money between themselves and someone they thought was another MTurk worker, may have overridden all other implicit and explicit manipulations. This idea is further validated by comments made by participants during the funneled debriefing when asked what their strategy was during the game: many said their goal was to split the money evenly, to be fair, or to be as equal as possible. This finding should be explored further in future research as it calls into question the generalizability of results when participants have no true "skin in the game". Effects found in the lab may not

translate to a real-world setting where real money, reputations, or relationships could be impacted by the behavior in question.

Future research should also continue to explore the ethics of taking the results of priming research into the real world. While the present research did not find an effect of the primes on behavior, past research has. Further, there are certainly already images of work-relevant behavior in many workplaces today; however, placing them there with the intent of influencing behavior in a particular direction likely goes above and beyond their current purpose. We also don't know much about the longevity of a prime's effect, particularly picture primes, though some initial research has found lasting effects over a four-day workweek (Latham & Piccolo, 2012). Are the effects fleeting? Does repeated exposure to the same picture prime eventually dull its effect? What are the effects of goal escalation and satiety for primed goals? Future research should investigate these questions and participant reactions to such manipulations to carefully weigh the pros and cons of implementing them in the real world (Weingarten et al., 2016).

General Discussion

While the collective results of Studies 1 and 2 were not as expected, the present research still contributes to the literature in several ways. As discussed previously, past priming research has largely focused on the effects of a prime without delving into why primes work. Study 1 helps us begin to understand some of the mechanisms underlying primes' effectiveness by measuring their impact on implicit associations. The results of Study 1 suggest that a prime may influence how we associate a primed concept with those around us. This provides very preliminary support for the first concept in Schroder and Thagard's (2013) integrated priming theory: parallel constraint satisfaction. Parallel constraint satisfaction hypothesizes a complex neutral network of associated concepts.

Based on this, we would expect that a single prime does not only activate the primed concept, but an entire map associated with that concept, including how we relate it to ourselves and others. While the effect on IAT scores found in Study 2 was actually the opposite of the one found in Study 1, there are several aspects of the design that may have contributed to this, as discussed previously.

Further, the present research is one of the first to demonstrate that the impact of a prime, particularly on implicit associations, may be moderated by whether or not the race of the individuals depicted in the prime matches the race of the person observing the prime. This does fit with social psychological research demonstrating that individuals tend to be more willing to trust, cooperate with, and help in-group members (e.g., Balliet et al., 2014; Foddy, Platow, & Yamagishi, 2009; Yamagishi, Mifune, Liu, & Pauling, 2008). Again, these results were not replicated in Study 2, but this might actually provide further evidence that these effects were due to the LDT, rather than the richer picture prime. Future research should attempt to replicate Study 1's results in larger samples, using only the IAT as an outcome measure, and should include a control condition, which was significant limitation of Study 1. Future research could also investigate whether other characteristics of the prime have a moderating effect, including gender, age, or culture, and should continue to ensure a sound theoretical basis for its hypotheses.

While Study 2's hypotheses were not supported, the results, or in some cases lack thereof, are still interesting. First, Study 1's results for concept activation as measured by the LDT were replicated in Study 2; however, a similar pattern of results was found in the control condition where participants did not view a prime. Importantly, this indicates that, rather than being influenced by the prime, target words were identified more quickly

and with higher accuracy, regardless of condition. This points to the importance of future research including a neutral or control condition so that any effects, implicit or otherwise, can be confirmed as resulting from presentation of the prime. Alternative, more precise, measures of implicit concept activation, including physiological measures, should also be explored in future research.

Finally, as discussed earlier, Study 2's lack of results as it relates to competitive and cooperative behavior sheds additional light on the replication problem others have encountered in implicit research. As suggested by Weingarten and colleagues (2016), one explanation for difficulty in replication is a differing value in the primed goal between replication attempts of the study. While the behavioral results in Study 2 were not a replication attempt, the fact that participants were eligible to earn more money, and that they believed they were splitting that money with another participant, may have been the strongest driver of their behavior in the task, regardless of which implicit or explicit condition they were in. Thus, future research should still investigate the behavioral effects of primes further, and be mindful of varying environmental factors and circumstances of the study that could result in participants valuing the goals or prime differently across studies. This should also be taken into consideration when generalizing a study's results. In fact, the present study may provide an initial window into the effect, or lack of effect, a prime has on behavior when there are real-life consequences. Overall, while the present research had mixed results, it still advances our understanding of why and how primes work.

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Appendix A

Pilot Testing

Sample. Pilot study participants were recruited from the psychology department and business school at the University of Missouri – St. Louis (UMSL). Sixty-five participants completed the pilot study; however, three were removed prior to analysis due to incomplete data. Participants received class extra credit for participating in the pilot study at the discretion of their course instructor. Sixty-five undergraduate students participated in the pilot study. A large portion of students at UMSL (both traditional and non-traditional) work part or full-time while obtaining their undergraduate degree.

Procedure and materials. The purpose of pilot testing was to determine which cooperative and competitive workplace scenario should be created for use in the main studies. Twelve images were selected from the internet for use in pilot testing: six depicting cooperation in an office scenario and six depicting competition (see Table 7). The study was conducted online using the Qualtrics survey platform. Participants were presented with each of the twelve images twice. In the first round, participants were shown one image at a time and asked to quickly provide the first three words that came to mind upon viewing each image. In the second round, images were displayed again and participants were asked to rate the amount of cooperation and the amount competition displayed in each image on a four-point Likert-type scale ranging from none to a lot. As such, participants provided two ratings for each image.

Results. Both the words used to describe each pilot image and the ratings of cooperation and competition were used to determine which of the twelve original images would be recreated for use in the present research. See Tables 7 and 8 for images, mean ratings, and standard deviations for each. Image 4 received the highest mean ratings for

amount of competition displayed (*M*=3.90). However, only 29% of the words participants used to describe this image were related to competition (e.g., compete, competition, conflict, battle). Further, while participants viewed it as competitive, arm wrestling is less representative of a behavior you might encounter in the workplace compared to some of the other images. As a result, this image was not chosen for use in the full study. Image 1 received the second highest mean ratings for amount of competition displayed (*M* = 3.85); however, ratings for cooperation were almost as high (*M* = 3.58). So as not to confound the concepts or behavior being primed, this image was not chosen for use in the full study. Image 5 received the third highest ratings mean ratings for amount of competition displayed (*M* = 3.84), and 38% of the words used to describe the image were related to competition. Further, Image 5 received the lowest cooperation ratings (*M* = 1.52) of all twelve images. Based on these factors, Image 5 was selected for use in the full study's competition condition.

Image 9 received the highest mean ratings for the amount of cooperation displayed (*M* = 3.85); however, this image displayed only individuals' arms from the elbow down. The researchers felt this was too dissimilar from the image chosen for use in the competition condition, and could become a confounding variable. Therefore, this image was not chosen for use in the present research. Images 8 and 10 received the second highest mean ratings for cooperation (*M* = 3.74). Image 10 received the lowest mean rating for competition (*M* = 1.46) of all twelve images, and 31% of words used to describe this image were related to cooperation (e.g., cooperate, teamwork, collaborate, cooperation). Comparatively, only 13% of the words used to describe Image 8 were

related to cooperation; therefore, Image 10 was selected for use in the full study's cooperation condition.

The images chosen for use in the full study were recreated in an office setting using volunteers, and controlling for differing factors in the environment that could not be controlled for when using images from the internet. For example, they were all taken in the same office with people sitting in the same position in each picture. Volunteers were shown the image they were intended to recreate, several photographs were taken, and the best photograph was selected for use in the present research. One image was selected for each condition described in Study 1, resulting in eight separate images. See Appendix B for all final images used in the present research's primary studies.

Table 7

Descriptive Statistics and Competitive Images Used in Pilot Study

Image Number	*1*	*2*	*3*	*4*	*5*	*6*
Image						
Comp. *n*	62	61	61	62	61	62
Comp. Mean	3.85	3.66	3.77	3.90	3.84	3.60
Comp. Std. Dev.	0.40	0.75	0.64	0.30	0.42	0.73
Coop. *n*	62	61	61	61	61	62
Coop. Mean	3.58	1.84	1.92	1.82	1.52	1.92
Coop. Std. Dev.	0.78	1.05	1.13	1.07	0.89	1.03

Table 8

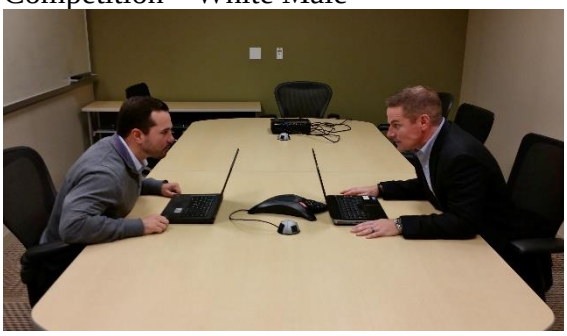
Descriptive Statistics and Cooperative Images Used in Pilot Study

Image Number	*7*	*8*	*9*	*10*	*11*	*12*
Image						
Comp. *n*	62	61	60	61	62	61
Comp. Mean	1.48	1.59	1.50	1.46	1.68	1.52
Comp. Std. Dev.	0.84	0.82	0.97	0.81	0.83	0.79
Coop. *n*	62	61	59	61	61	61
Coop. Mean	3.66	3.74	3.85	3.74	3.56	3.16
Coop. Std. Dev.	0.54	0.54	0.58	0.66	0.56	0.88

Appendix B

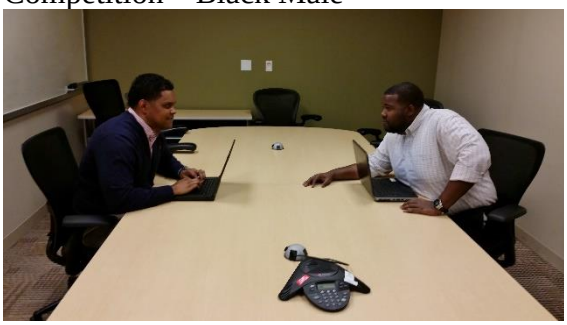
Competition – White Female

Competition – White Male



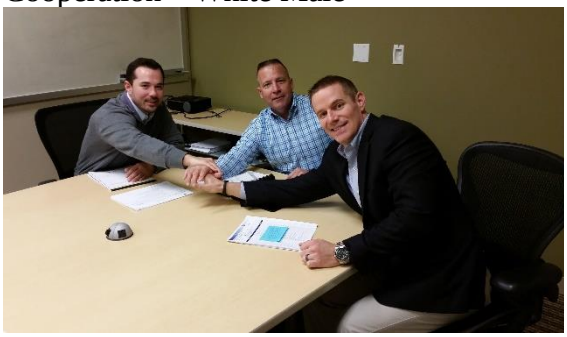
Competition – Black Female

Competition – Black Male



Cooperation – White Female

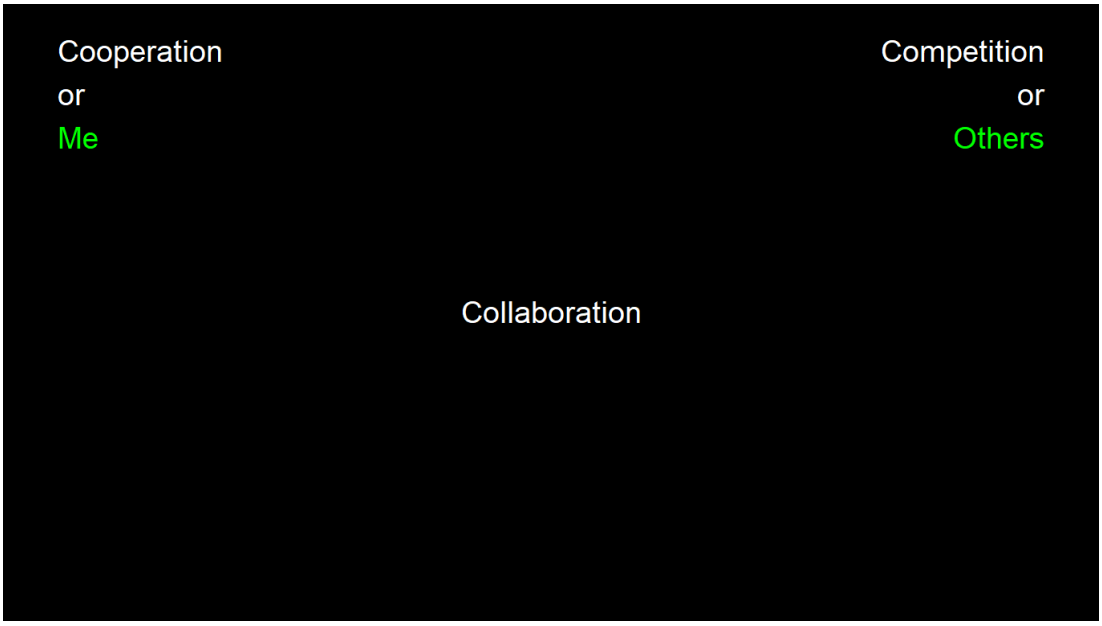
Cooperation – White Male

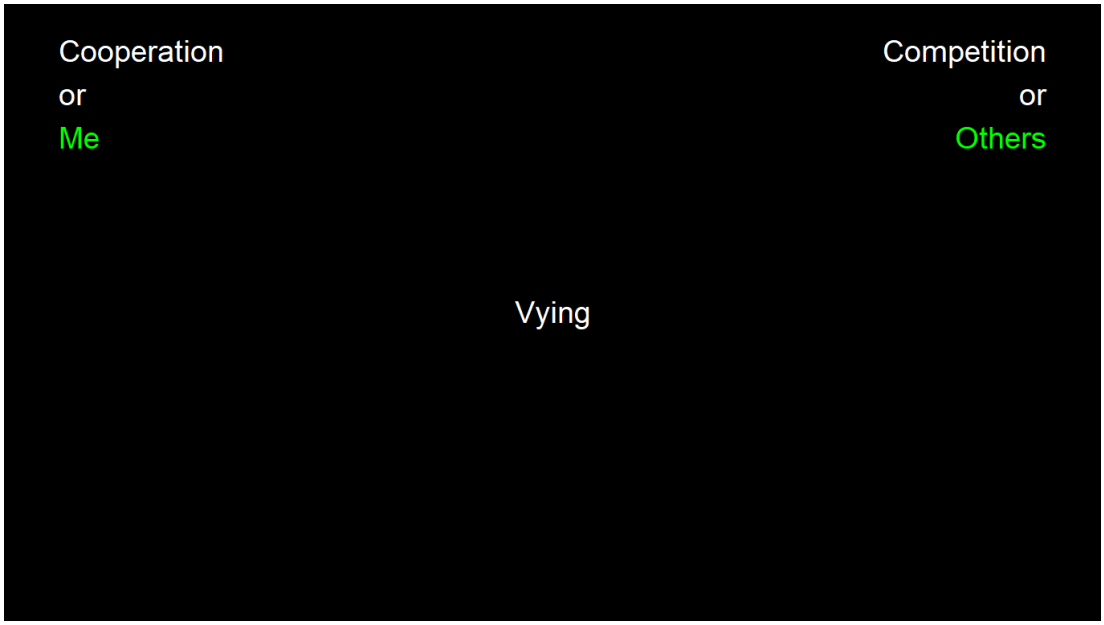


Cooperation – Black Female

Cooperation – Black Male

Appendix C


Cooperation
or
Me
Competition
or
Others
Collaboration


Cooperation
or
Me
Competition
or
Others
Vying

Appendix D

Please read the following instructions carefully.

You are about to play a game over the internet with another participant. / You are about to play a game over the internet with another participant called **The Community Game** - a cooperative game in which players should keep the collective benefit of the group in mind. / You are about to play a game over the internet with another participant called **Battle of Wits** - a competitive game in which players should keep their own interests in mind.

Important Information Regarding Your Payment:

- You and the other participant will receive bonus dollars equal to the amount of money you each earn during the game.
- Your bonus will be added to your base pay of $1. You are playing this game for real money.
- You will be compensated the total of your base and bonus pay after the researcher has been able to verify that you completed the study in-full.

----------page break----------

Instructions / Community Game Instructions / Battle of Wits Instructions

- You will play two rounds of the game
- In each round:
    - $2.50 will be divided between you and the other participant for a total of $5 in the game.
    - You will be either the *proposer* or the *responder*.
        - The *proposer* makes an offer of how to split the money.
        - The *responder* decides to either accept or reject the offer.
- If the *responder* accepts the offer:
    - The money is split as proposed.
    - The amount you each earn is added to your bonus in that round.
- If the *responder* rejects the offer:
    - No one receives any money.
    - Nothing will be added to your bonus in that round.

Before each round begins, you will learn whether you are the *proposer* or the *responder*. Remember, in order to be paid, you must complete this study in its entirety.

Appendix E

Ultimatum Game Understanding Checks

Please answer the following questions about the game before you play:

1. What is the role of the proposer?
    a. To make an offer of how to split the money
    b. To decide to either accept or reject the offer
    c. None of the above
2. How much money will be added to your bonus in each round?
    a. $2.50
    b. The amount earned, if the responder accepts the offer
    c. There are no bonuses available

Funneled debriefing (Bargh & Chartrand, 2000):

1. What do you think the purpose of the experiment was?
2. What do you think this experiment was trying to study?
3. Did you think that any of the tasks you did were related in any way? If yes, in what way were they related?
4. Did anything you did on one task affected what you did on any other task? If yes, how exactly did it affect you?
5. When you were completing the task that asked you to split money between yourself and another participant, did you have any particular goal or strategy?
6. Did you notice any particular pattern or theme to the words that were included in the task that asked you to identify whether or not the words appearing on the screen were real words?
7. What were you trying to do during the categorization tasks? Did you have any particular goal or strategy?
8. Did you think that the picture you saw at the beginning of the study in any way affected your performance on any of the other tasks you completed?
9. If so, how?

Questions included after debriefing (note that these questions will not affect payment of participants):

1. Do you participate in MTurk-related message boards?
    a. Yes
    b. No
2. If yes to the above, have you read anything about this study on an MTurk-related message board or elsewhere prior to completing it?
    a. Yes
    b. No
3. If yes to the above, please explain what you read about this study prior to completing it.

At this point, the same picture prime shown previously will be displayed again and the following questions asked.

1. I like the people pictured in the image above.
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree

2. I believe the people pictured in the image above are similar to me.
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree